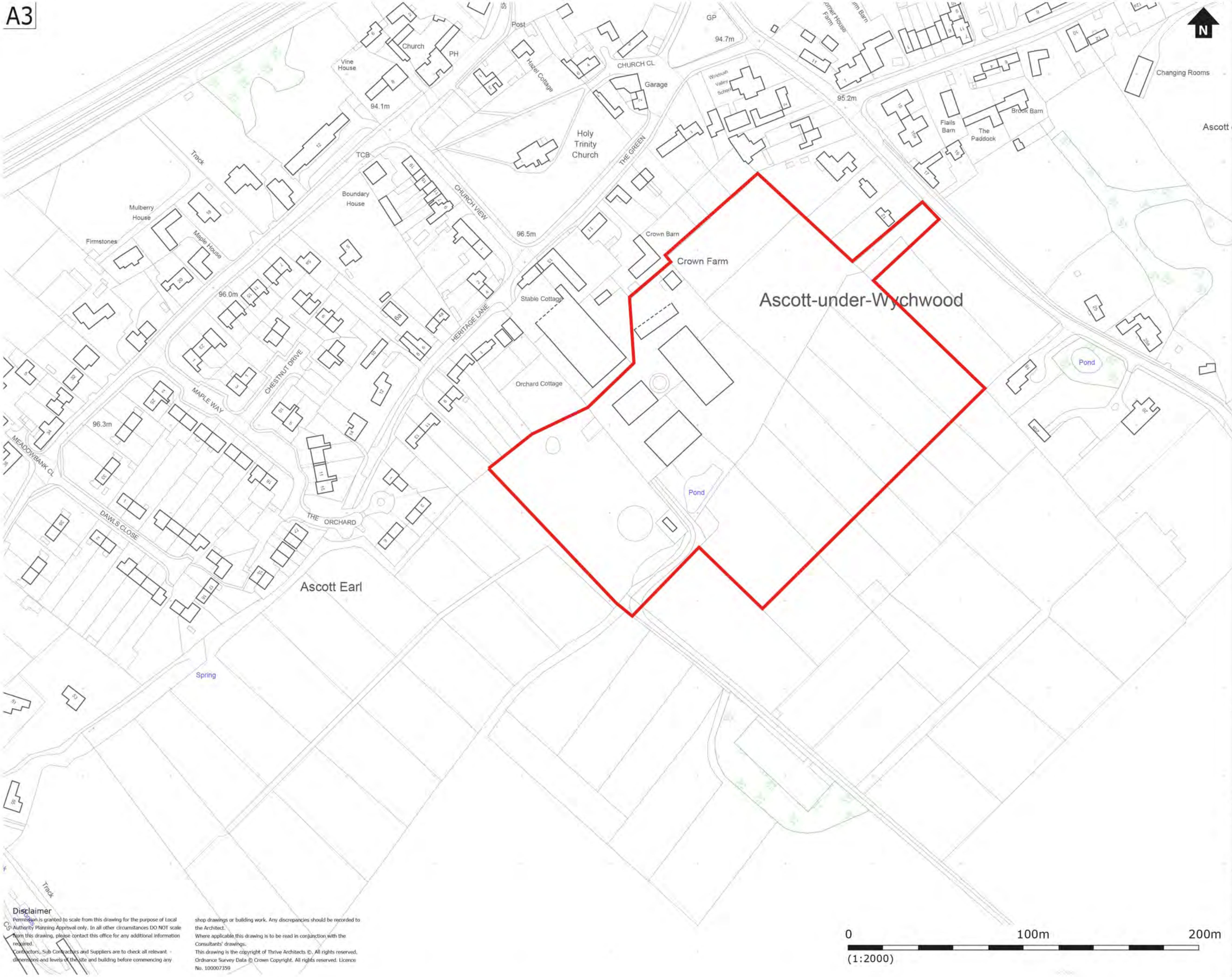
Appendices

Appendix A

Location Plan

A3



REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P01	Preliminary Issue	12.09.22	IO	GR
P02	Red line boundary updated	17.10.22	IO	GR
P03	Red line boundary updated	02.11.22	IO	IO

thrive. architects

Romsey Office

Building 300, The Grange, Romsey Road, Michelmersh, SO51 0AE
t: 01794 367703 f: 01794 367276 www.thrivearchitects.co.uk

PROJECT

Ascott under Wychwood

For: Obsidian Strategic

DRAWING

Site Location Plan

SCALE	DATE	AUTHOR	CHK'D
1:2000 @ A3	12.09.22	IO	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	SLP_01	P03

Disclaimer

Permission is granted to scale from this drawing for the purpose of Local Authority Planning Approval only. In all other circumstances DO NOT scale from this drawing, please contact this office for any additional information required.

Contractors, Sub Contractors and Suppliers are to check all relevant dimensions and levels of the site and building before commencing any shop drawings or building work. Any discrepancies should be recorded to the Architect.

Where applicable this drawing is to be read in conjunction with the Consultants' drawings.

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Ordnance Survey Data © Crown Copyright. All rights reserved. Licence No. 100007359

Appendix B

Concept Masterplan

A3

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P01	Preliminary Issue	29.06.2022	IO	GR
P02	General Update	01.07.2022	IO	GR
P03	Pre-app Issue	14.09.2022	IO	GR
P04	Redline update. General amendments	17.10.2022	IO	GR
P05	Playground area and POS updated	19.10.22	IO	GR
P06	Redline update	02.11.22	IO	IO
P07	Layout Update	20.02.23	GR/jd	
P08	Layout Update	08.03.23	IO	GR
P09	Layout update to increase back gardens backing onto northern boundary	20.03.23	GR/IO	GR
P10	Layout update	19.04.23	GR/IO	GR

Site Boundary
Main Vehicular access/egress
Pedestrian access to existing PROW
Improved cycle/pedestrian connectivity
Existing Vegetation
Proposed Vegetation
Proposed Development Plots
Public Open Space
Shared Surface
Potential location of Playground Area or Outdoor Sport Pitches TBC
Primary route
Private driveways
Existing PROW
Proposed SuDS
Existing Stone Wall

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PROJECT
Ascott under Wychwood

For: Obsidian Strategic

DRAWING
Concept Masterplan

SCALE	DATE	AUTHOR	CHK'D
1:2000 @ A3	10.06.22	IO	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	CMP_01	P10

Appendix C

Lead Local Flood Authority's Consultation Response

Application no: 23/01504/OUT
Location: Land West Of London Lane Ascott Under Wychwood

Lead Local Flood Authority

Recommendation:

No Objection Subject to Conditions

Condition
The approved drainage system shall be implemented in accordance with the approved Detailed Design prior to the use of the building commencing:

Document
Floor Risk Assessment
Ref: 010_8211067_BW_Flood_Risk_Assessment
Issue 2: 05 May 2023

Drawing
Outline Surface Water Drainage Strategy
Drawing No: 8211067-SK03, P1

All relevant Hydraulic calculations produced via Microdrainage
File 8211067 - OUTLINE SW STR. Date 05/05/2023

Reason:
To ensure that the principles of sustainable drainage are incorporated into this proposal.

Condition:
Prior to first occupation, a record of the installed SuDS and site wide drainage scheme shall be submitted to and approved in writing by the Local Planning Authority for deposit with the Lead Local Flood Authority Asset Register. The details shall include:

(a) As built plans in both .pdf and .shp file format;

(b) Photographs to document each key stage of the drainage system when installed on site;

(c) Photographs to document the completed installation of the drainage structures on site;

(d) The name and contact details of any appointed management company information

Officer's Name: Shada Hasan
Officer's Title: LLFA Engineer
Date:28/06/2023

Appendix D

Topographical Survey

N

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
S1	430061.476	218544.509	99.211
S2	430097.949	218508.343	102.318
S3	430153.394	218435.609	103.988
S4	430115.441	218536.617	100.672
S5	430151.503	218568.452	100.276
S6	430114.294	218392.401	105.632
S7	430290.894	218625.135	97.812
S8	430350.271	218569.482	101.164
S9	429941.235	218446.625	100.811
S10	429915.450	218473.591	100.035

OS Note:

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigation Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models.

The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Rev	Date	Description	Drawn	Q. Ref
1	5.4.22	Additional survey added	ER	GH13452

greenhatch group

- Topographical Surveys
- Site Engineering
- Utility / CCTV Surveys
- Measured Building Surveys
- 3D Laser Scanning
- Revit & BIM Models

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NE4 7YL
t. (01912) 736391

London
27, Cornwall Terrace Mews
Regents Park
London
NW1 5LL
t. (02072) 241806

CLIENT

Obsidian Strategic Asset Management Ltd

PROJECT

Ascott-under-Wychwood, West Oxfordshire, OX7 6AU

TITLE

Topographical Survey

SCALE	DATE
A1@ 1: 1000	01.02.22
DRAWN	QUALITY REF
ER	GH12817

Level datum	See note
Grid orientation	See note
Job number	42917

Drawing No.	Rev.
42917_T	1

Comments

This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:

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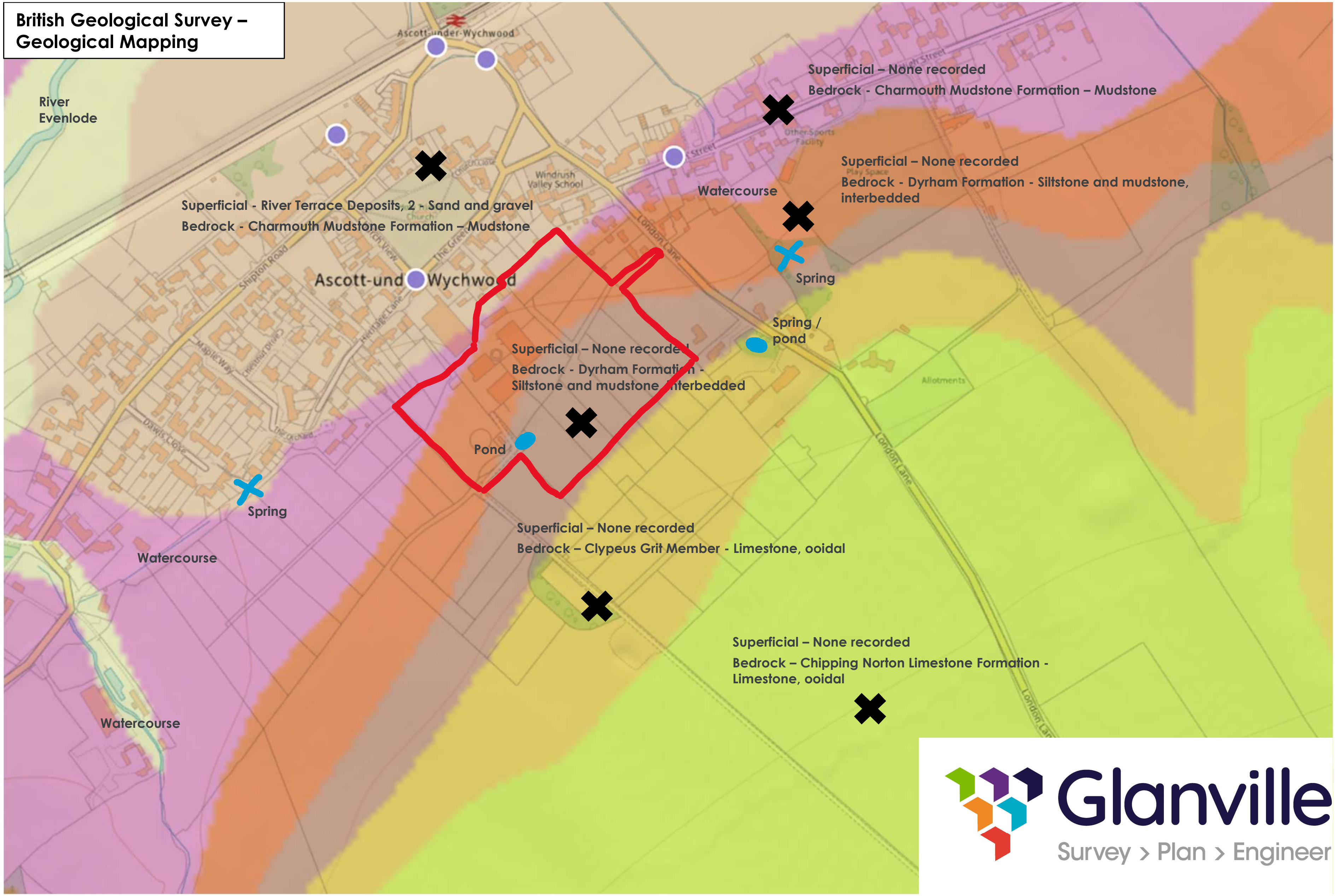
Appendix E

Geological Mapping


British Geological Survey – Geological Mapping
Ascott-under-Wychwood
River Evenlode
Superficial – None recorded
Bedrock - Charmouth Mudstone Formation – Mudstone
Superficial – None recorded
Bedrock - Dyrham Formation - Siltstone and mudstone, interbedded
Watercourse
Superficial - River Terrace Deposits, 2 - Sand and gravel
Bedrock - Charmouth Mudstone Formation – Mudstone
Windrush Valley School
Ascott-under-Wychwood
Spring
Spring / pond
Superficial – None recorded
Bedrock - Dyrham Formation - Siltstone and mudstone, interbedded
Pond
Spring
Watercourse
Superficial – None recorded
Bedrock – Clypeus Grit Member - Limestone, ooidal
Superficial – None recorded
Bedrock – Chipping Norton Limestone Formation - Limestone, ooidal
Watercourse
London Lane
Allotments
Glanville
Survey › Plan › Engineer

Appendix F

BGS Infiltration SuDS GeoReport

GeoReports

British Geological Survey

Debbie Wigston
Glanville Consultants Ltd
Unit 3
Grovelands Business Centre
Boundary Way
Hemel Hempstead Industrial Estate
Hemel Hempstead
HP2 7TE

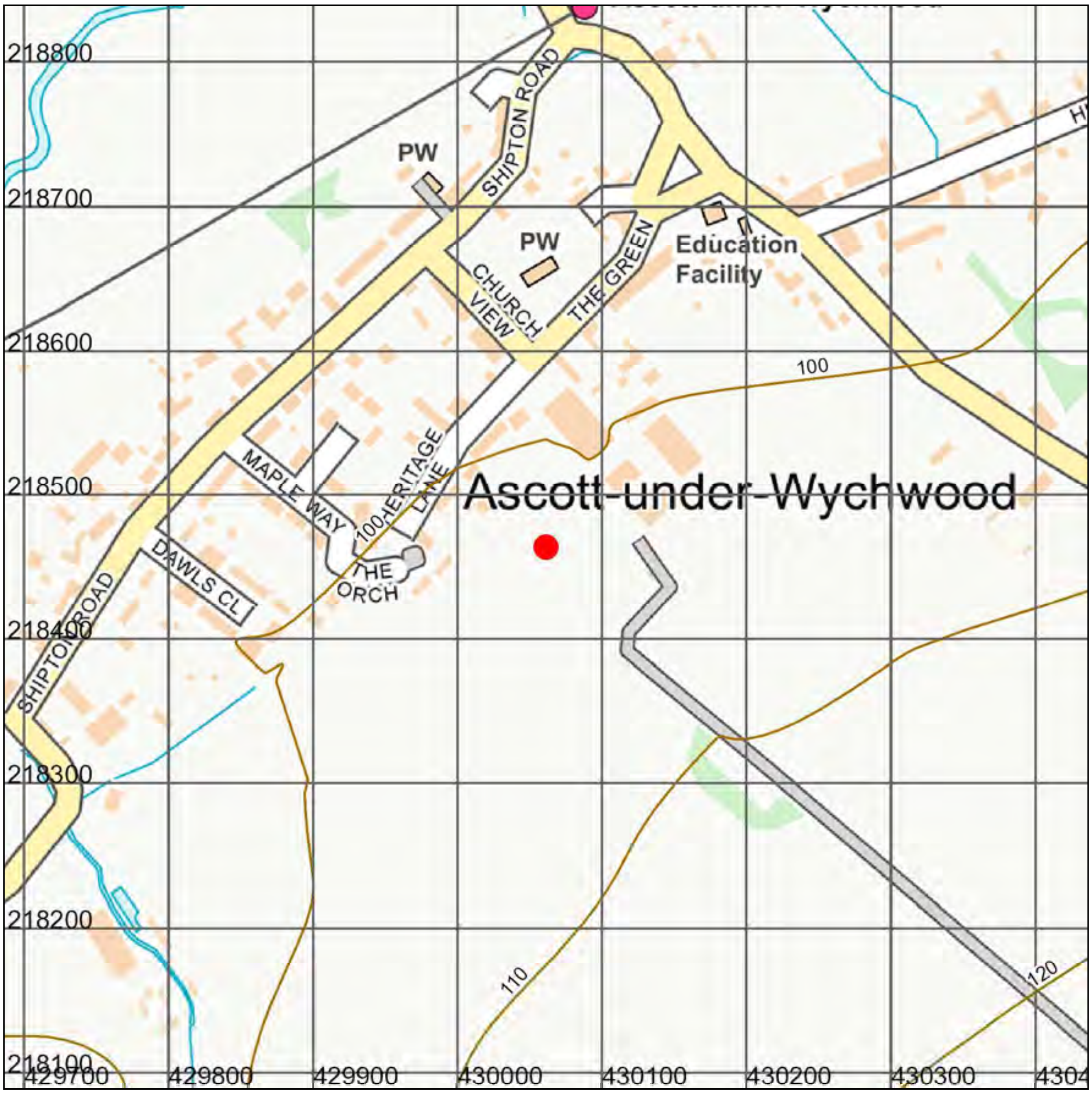
Infiltration SuDS GeoReport:

This report provides information on the suitability of the subsurface for the installation of infiltration sustainable drainage systems (SuDS). It provides information on the properties of the subsurface with respect to significant constraints, drainage, ground stability and groundwater quality protection.

Report Id: ***BGS_324503/31783***

Client reference: 8211067

Search location



Contains OS data © Crown Copyright and database right 2022. OS OpenMap Local: Scale: 1:5 000 (1cm = 50 m)
Search location indicated in red

Point centred at: 430061,218464

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Assessment for an infiltration sustainable drainage system

Introduction

Sustainable drainage systems (SuDS) are drainage solutions that manage the volume and quality of surface water close to where it falls as rain. They aim to reduce flow rates to rivers, increase local water storage capacity and reduce the transport of pollutants to the water environment. There are four main types of SuDS, which are often designed to be used in sequence. They comprise:

- **source control:** systems that control the rate of runoff
- **pre-treatment:** systems that remove sediments and pollutants
- **retention:** systems that delay the discharge of water by providing surface storage
- **infiltration:** systems that mimic natural recharge to the ground.

This report focuses on infiltration SuDS. It provides subsurface information on the properties of the ground with respect to drainage, ground stability and groundwater quality protection. It is intended principally for those involved in the preliminary assessment of the suitability of the ground for infiltration SuDS, and those involved in assessing proposals from others for sustainable drainage, but it may also be useful to help house-holders judge whether or not further professional advice should be sought. If in doubt, users should consult a suitably-qualified professional about the results in this report before making any decisions based upon it.

This GeoReport is structured in two parts:

- **Part 1. Summary data**.

  Comprises three maps that summarise the data contained within Part 2.

- **Part 2. Detailed data**.

  Comprises a further 24 maps in four thematic sections:

  - **Very significant constraints.** Maps highlight areas where infiltration may result in adverse impacts due to factors including: ground instability (soluble rocks, non-coal shallow mining and landslide hazards); persistent shallow groundwater, or the presence of made ground, which may represent a ground stability or contamination hazard.
  - **Drainage potential**. Maps indicate the drainage potential of the ground, by considering subsurface permeability, depth to groundwater and the presence of floodplain deposits.
  - **Ground stability**. Maps indicate the presence of hazards that have the potential to cause ground instability resulting in damage to some buildings and structures, if water is infiltrated to the ground.
  - **Groundwater protection**. Maps provide key indicators to help determine whether the groundwater may be susceptible to deterioration in quality as a result of infiltration.

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This report considers the suitability of the subsurface for the installation of infiltration SuDS, such as soakaways, infiltration basins or permeable pavements. It provides subsurface data to indicate whether, and which type of infiltration system may be appropriate. It does not state that infiltration SuDS are, or are not, appropriate as this is highly dependent on the design of the individual system. This report therefore describes the subsurface conditions at the site, allowing the reader to determine the suitability of the site for infiltration SuDS.

The map and text data in this report is similar to that provided in the '*Infiltration SuDS Map: Detailed'* national map product. For further information about the data, consult the '*User Guide for the Infiltration SuDS Map: Detailed'*, available from http://nora.nerc.ac.uk/16618/.

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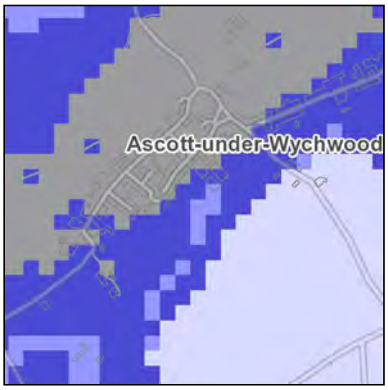
PART 1: SUMMARY DATA

This section provides a summary of the data.

In terms of the drainage potential, is the ground suitable for infiltration SuDS?



Contains OS data © Crown Copyright and database right 2022

- Highly compatible for infiltration SuDS. The subsurface is likely to be suitable for free-draining infiltration SuDS.
- Probably compatible for infiltration SuDS. The subsurface is probably suitable although the design may be influenced by the ground conditions.
- Opportunities for bespoke infiltration SuDS. The subsurface is potentially suitable although the design will be influenced by the ground conditions.
- Very significant constraints are indicated. There is a very significant potential for one or more hazards associated with infiltration.

Is ground instability likely to be a problem?

Contains OS data © Crown Copyright and database right **2022**

- Increased infiltration is very unlikely to result in ground instability.
- Ground instability problems may be present or anticipated, but increased infiltration is unlikely to result in ground instability.
- Ground instability problems are probably present. Increased infiltration may result in ground instability.
- There is a very significant potential for one or more geohazards associated with infiltration.

Is the groundwater susceptible to deterioration in quality?

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- The groundwater is not expected to be especially vulnerable to contamination.
- The groundwater may be vulnerable to contamination.
- The groundwater is likely to be vulnerable to contaminants.
- Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

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PART 2: DETAILED DATA

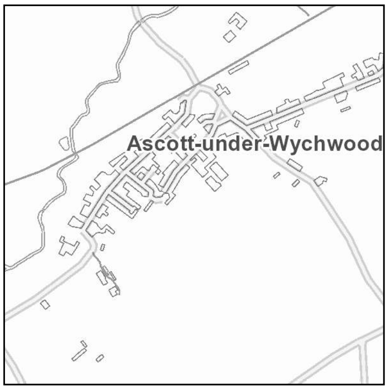
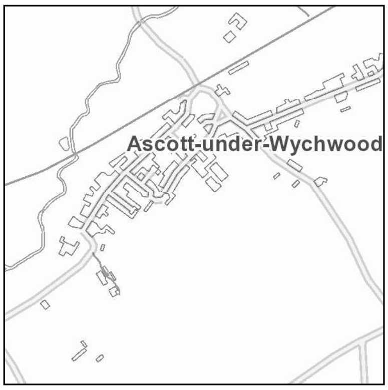
This section provides further information about the properties of the ground and will help assess the suitability of the ground for infiltration SuDS.

Section 1. Very significant constraints

Where maps are overlain by grey polygons, geological or hydrogeological hazards may exist that could be made worse by infiltration. The following hazards are considered:

- soluble rocks
- landslides
- shallow mining
- shallow groundwater
- made ground

For more information read 'Explanation of terms' at the end of this report.

Soluble rock hazard	
 Contains OS data © Crown Copyright and database right 2022	Very significant soluble rock hazard. Soluble rocks are present with a very significant possibility of localised subsidence that could be initiated or made worse by infiltration. The site investigation should consider whether the potential for or the consequences of subsidence as a result of infiltration are significant.
	Very significant soluble rock hazards are not present; however this hazard may still need to be considered. See Part 3.
Landslide hazard	
 Contains OS data © Crown Copyright and database right 2022	Very significant landslide hazard. Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail. The site investigation should consider whether the potential for or the consequences of landslide as a result of infiltration are significant.
	Very significant landslide hazards are not present; however this hazard may still need to be considered. See Part 3.

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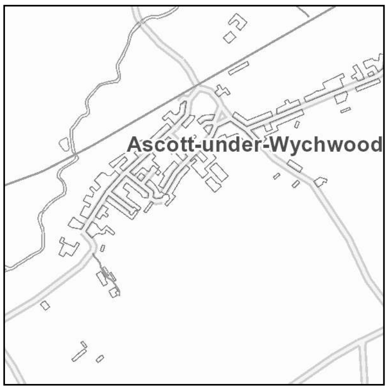
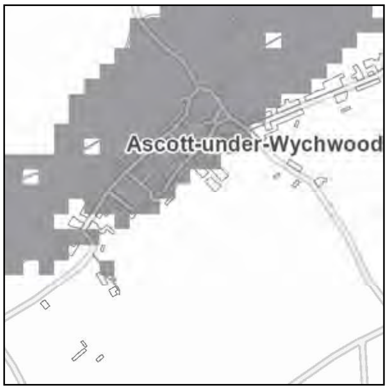
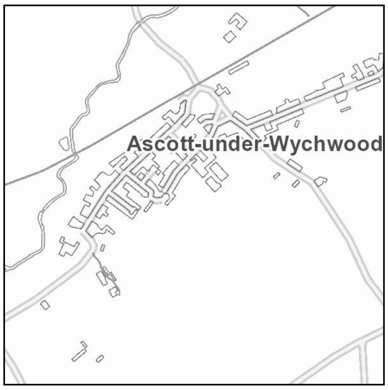
Shallow mining hazard		
 Contains OS data © Crown Copyright and database right 2022	■	Very significant mining hazard. Shallow mining is likely to be present with a very significant possibility of localised subsidence that could be initiated or made worse by increased infiltration. Also, infiltration may increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of subsidence and/or remobilisation of pollutants as a result of infiltration are significant.
	☐	Very significant mining hazards are not present; however this hazard may still need to be considered. See Part 3.

Persistent shallow groundwater		
 Contains OS data © Crown Copyright and database right 2022	■	Very high likelihood of persistent or seasonally shallow groundwater. Persistent or seasonally shallow groundwater is likely to be present. Infiltration may increase the likelihood of soakaway inundation, or groundwater emergence at the surface. The site investigation should consider whether the potential for or the consequences of groundwater level rise as a result of infiltration are significant.
	☐	See Part 2 for the likely depth to water table.

Made ground		
 Contains OS data © Crown Copyright and database right **2022**	■	Made ground present. Made ground is present at the surface. Infiltration may affect ground stability or increase the possibility of remobilising pollutants. The site investigation should consider whether the potential for or consequences of ground instability and/or pollutant leaching as a result of infiltration are significant.
	☐	None recorded

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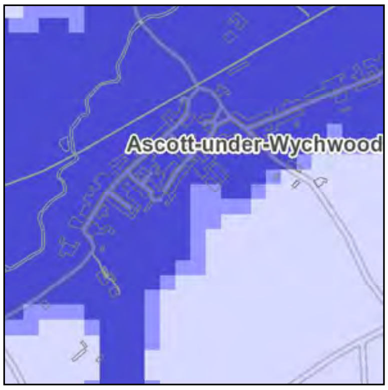
Section 2. Drainage potential

The following pages contain maps that will help you assess the drainage potential of the ground by considering the:

- depth to water table
- permeability of the superficial deposits
- thickness of the superficial deposits
- permeability of the bedrock
- presence of floodplains

Superficial deposits are not present everywhere and therefore some areas of the *superficial deposit permeability* map may not be coloured. Where this is the case, the *bedrock permeability* map shows the likely permeability of the ground. Superficial deposits in some places are very thin and hence in these places you may wish to consider both the permeability of the superficial deposits and the permeability of the bedrock. The *superficial thickness* map will tell you whether the superficial deposits are thin (< 3 m thick) or thick (>3 m). Where they are over 3 m thick, the permeability of the bedrock may not be relevant.

For more information read 'Explanation of terms' at the end of this report.

Depth to groundwater table	
 Contains OS data © Crown Copyright and database right 2022	Groundwater is likely to be **more than 5 m** below the ground surface throughout the year.
	Groundwater is likely to be between **3 and 5 m** below the ground surface for at least part of the year.
	Groundwater is likely to be **less than 3 m** below the ground surface for at least part of the year.

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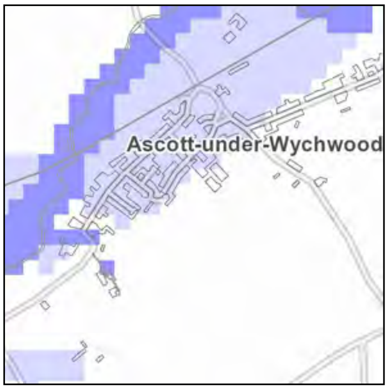
Superficial deposit permeability



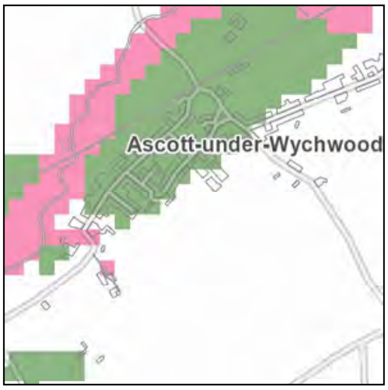
Contains OS data © Crown Copyright and database right 2022

- Superficial deposits are likely to be **free-draining**.
- The superficial deposit permeability is **spatially variable**, but likely to permit moderate infiltration.
- Superficial deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

- Very Low
- Low
- Moderate
- High
- Very High

Minimum



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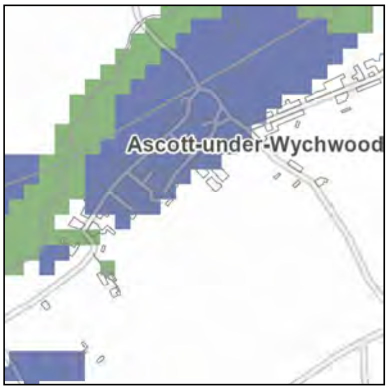
Maximum



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Superficial deposit thickness

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- The thickness of superficial deposits is **< 3 m** and hence the permeability of the ground may be dependent on both the superficial deposits (where present) and underlying bedrock (see below).
- The thickness of superficial deposits is **> 3 m** and hence the permeability of the superficial deposits is likely to determine the permeability of the ground.

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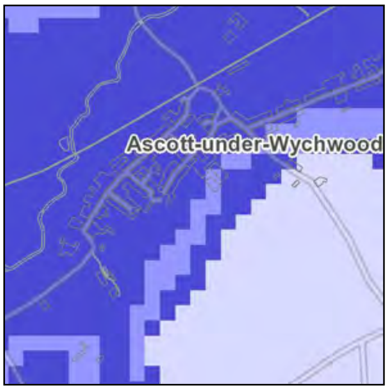
Bedrock permeability



Contains OS data © Crown Copyright and database right **2022**

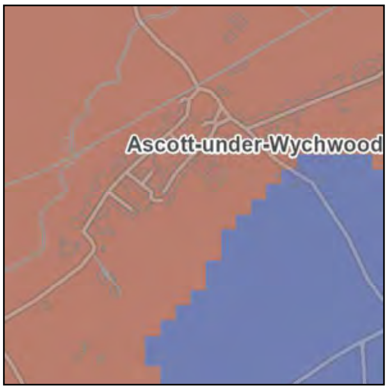
- Bedrock deposits are likely to be **free-draining**.
- The bedrock permeability is **spatially variable**, but likely to permit moderate infiltration.
- Bedrock deposits are likely to be **poorly draining**.

These maps show the permeability range that is summarised above.

Key

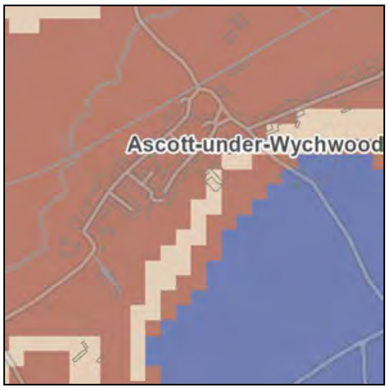
- Very Low
- Low
- Moderate
- High
- Very High

Minimum



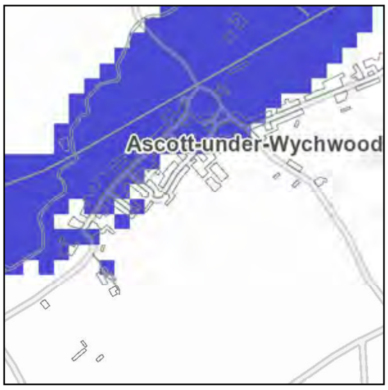
Contains OS data © Crown Copyright and database right 2022

Maximum



Contains OS data © Crown Copyright and database right 2022

Geological indicators of flooding



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- Superficial floodplain deposits or low-lying coastal areas have been identified. Groundwater levels may rise in response to high river or tide levels, potentially causing inundation of subsurface infiltration SuDS.

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Section 3. Ground stability

The following pages contain maps that will help you assess whether infiltration may impact the stability of the ground. They consider hazards associated with:

- soluble rocks
- landslides
- shallow mining
- running sands
- swelling clays
- compressible ground, and
- collapsible ground

In the following maps, geohazards that are identified in green are unlikely to prevent infiltration SuDS from being installed, but they should be considered during design. For more information read 'Explanation of terms' at the end of this report.

<table>
<tr><th colspan="2">Soluble rocks</th></tr>
<tr><td rowspan="4">Contains OS data © Crown Copyright and database right 2022</td><td>Increased infiltration is unlikely to result in subsidence.</td></tr>
<tr><td>Increased infiltration is unlikely to cause localised subsidence, but potential impacts should be considered.</td></tr>
<tr><td>Increased infiltration may result in localised subsidence. The potential for or the consequences of subsidence associated with soluble rocks should be considered.</td></tr>
<tr><td>Very significant possibility of localised subsidence that could be initiated or made worse by infiltration.</td></tr>
</table>

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Landslides

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(very light green)	Increased infiltration is unlikely to lead to slope instability.
(light green)	Slope instability problems may be present or anticipated, but increased infiltration is unlikely to cause instability
(dark green)	Slope instability problems are probably present or have occurred in the past, and increased infiltration may result in slope instability.
(grey)	Slope instability problems are almost certainly present and may be active. An increase in moisture content as a result of infiltration may cause the slope to fail.

Shallow mining

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(very light green)	Increased infiltration is unlikely to lead to subsidence.
(light green)	Shallow mining is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
(dark green)	Shallow mining could be present with a significant possibility that localised subsidence could be initiated or made worse by increased infiltration.
(grey)	Shallow mining is likely to be present, with a very significant possibility that localised subsidence may be initiated or made worse by increased infiltration.

Running sand

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(very light green)	Increased infiltration is unlikely to cause ground collapse associated with running sands.
(light green)	Running sand is possibly present. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
(dark green)	Significant possibility for running sand problems. Increased infiltration may result in a geohazard.

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Swelling clays

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- Increased infiltration is unlikely to cause shrink-swell ground movement.
- Ground is susceptible to shrink-swell ground movement. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Ground is susceptible to shrink-swell ground movement. Increased infiltration may result in a geohazard.

Compressible ground

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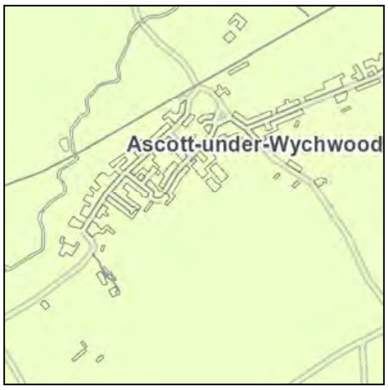
- Increased infiltration is unlikely to lead to ground compression.
- Compressibility and uneven settlement hazards are probably present. Increased infiltration may result in a geohazard.

Collapsible ground



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- Increased infiltration is unlikely to result in subsidence.
- Deposits with potential to collapse when loaded and saturated are possibly present in places. Increased infiltration is unlikely to cause a geohazard, but potential impacts should be considered.
- Deposits with potential to collapse when loaded and saturated are probably present in places. Increased infiltration may result in a geohazard.

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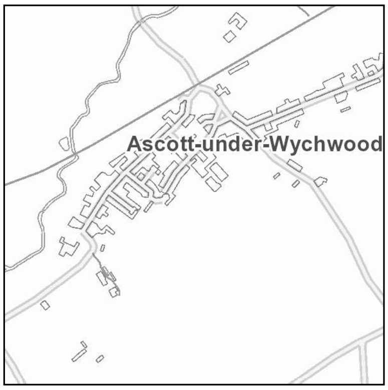
Section 4. Groundwater quality protection

The following pages contain maps showing some of the information required to ensure the protection of groundwater quality. Data presented includes:

- groundwater source protection zones (Environment Agency data)
- predominant flow mechanism
- made ground

For more information read 'Explanation of terms' at the end of this report.

Groundwater source protection zones



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Derived in part from Source Protection Zone data provided under licence from the Environment Agency © Environment Agency 2022.

(white)	Groundwater is not within a source protection zone.
(orange-brown)	Source protection zone IV
(blue)	Source protection zone III
(green)	Source protection zone II
(red)	Source protection zone I

Predominant flow mechanism

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(light pink)	Water is likely to percolate through the unsaturated zone to the groundwater through either the pore space in granular media or through porespace and fractures; these processes have some potential for contaminant removal and breakdown.
(mauve)	Water is likely to percolate through the unsaturated zone to the groundwater through fractures, a process which has little potential for contaminant removal and breakdown.

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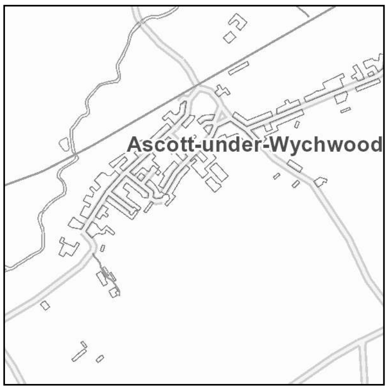
Made ground	
Contains OS data © Crown Copyright and database right 2022	Made ground is present at the surface. Infiltration may increase the possibility of remobilising pollutants.

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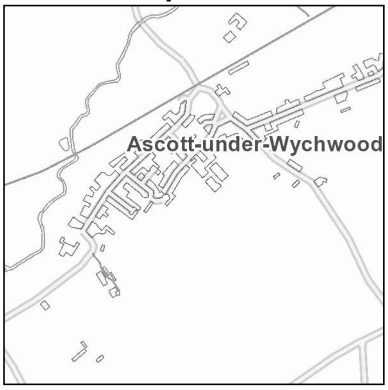
Section 5. Geological Maps

The following maps show the artificial, superficial and bedrock geology within the area of interest.

Artificial deposits



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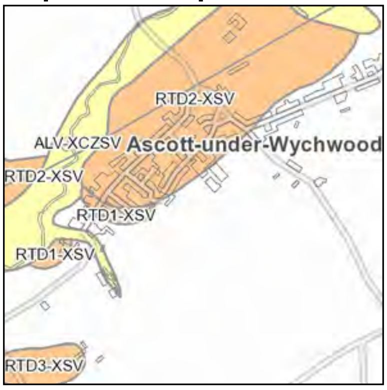
Superficial deposits



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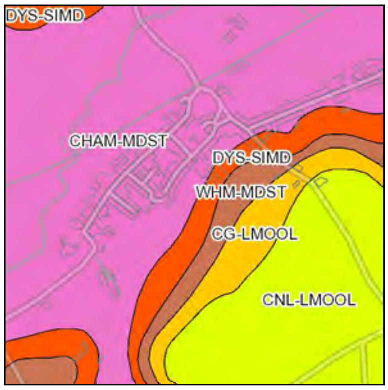
Bedrock



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Fault

Coal, ironstone or mineral vein

Note: Faults and Coals, ironstone & mineral veins are shown for illustration and to aid interpretation of the map. Not all such features are shown and their absence on the map face does not necessarily mean that none are present

Key to Artificial deposits:
No deposits recorded by BGS in the search area

Key to Superficial deposits:

Map colour	Computer Code	Rock name	Rock type
	ALV-XCZSV	ALLUVIUM	CLAY, SILT, SAND AND GRAVEL
	RTD1-XSV	RIVER TERRACE DEPOSITS, 1	SAND AND GRAVEL
	RTD2-XSV	RIVER TERRACE DEPOSITS, 2	SAND AND GRAVEL
	RTD3-XSV	RIVER TERRACE DEPOSITS, 3	SAND AND GRAVEL

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Key to Bedrock geology:

Map colour	Computer Code	Rock name	Rock type
	CNL-LMOOL	CHIPPING NORTON LIMESTONE FORMATION	LIMESTONE, OOIDAL
	TY-LMOOL	TAYNTON LIMESTONE FORMATION	LIMESTONE, OOIDAL
	CG-LMOOL	CLYPEUS GRIT MEMBER	LIMESTONE, OOIDAL
	WHM-MDST	WHITBY MUDSTONE FORMATION	MUDSTONE
	DYS-SIMD	DYRHAM FORMATION	SILTSTONE AND MUDSTONE, INTERBEDDED
	CHAM-MDST	CHARMOUTH MUDSTONE FORMATION	MUDSTONE

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Limitations of this report:

- This report is concerned with the potential for infiltration-to-the-ground to be used as a SuDS technique at the site described. It only considers the subsurface beneath the search area and does NOT consider potential surface or subsurface impacts outside of that area.
- This report is NOT an alternative for an on-site investigation or soakaway test, which might reach a different conclusion.
- This report must NOT be used to justify disposal of foul waste or grey water.
- This report is based on and limited to an interpretation of the records held by the British Geological Survey (BGS) at the time the search is performed. The datasets used (with the exception of that showing depth to water table) are based on 1:50 000 digital geological maps and not site-specific data.
- Other more specific and detailed ground instability information for the site may be held by BGS, and an assessment of this could result in a modified assessment.
- To interpret the maps correctly, the report must be viewed and printed in colour.
- The search does NOT consider the suitability of sites with regard to:
    - previous land use,
    - potential for, or presence of contaminated land
    - presence of perched water tables
    - shallow mining hazards relating to coal mining. Searches of coal mining should be carried out via The Coal Authority Mine Reports Service: www.coalminingreports.co.uk.
    - made ground, where not recorded
    - proximity to landfill sites (searches for landfill sites or contaminated land should be carried out through consultation with local authorities/Environment Agency)
    - zones around private water supply boreholes that are susceptible to groundwater contamination.
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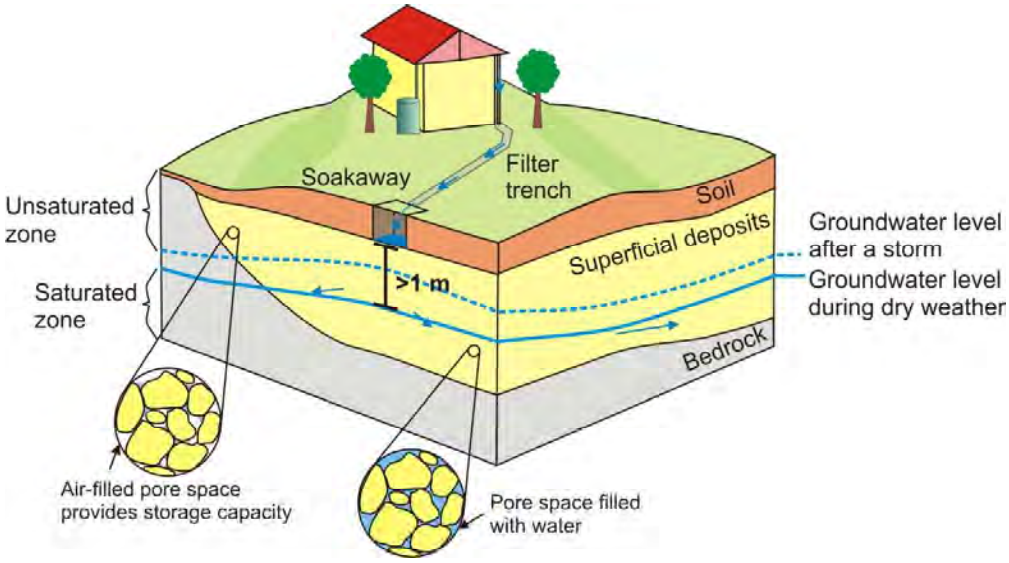
Explanation of terms

Depth to groundwater

In the shallow subsurface, the ground is commonly unsaturated with respect to water. Air fills the spaces within the soil and the underlying superficial deposits and bedrock. At some depth below the ground surface, there is a level below which these spaces are full of water. This level is known as the groundwater level, and the water below it is termed the groundwater. When water is infiltrated, the groundwater level may rise temporarily. To ensure that there is space in the unsaturated zone to accommodate this, there should be a minimum thickness of 1 m between the base of the infiltration system and the water table. An estimate of the *depth to groundwater* is therefore useful in determining whether the ground is suitable for infiltration.



Groundwater flooding

Groundwater flooding occurs when a rise in groundwater level results in very shallow groundwater or the emergence of groundwater at the surface. If infiltration systems are installed in areas that are susceptible to groundwater flooding, it is possible that the system could become inundated. The susceptibility map seeks to identify areas where the geological conditions and water tables indicate that groundwater level rise could occur under certain circumstances. A high susceptibility to groundwater flooding classification does not mean that groundwater flooding has ever occurred in the past, or will do so in the future as the susceptibility maps do not contain information on how often flooding may occur. The susceptibility maps are designed for planning; identifying areas where groundwater flooding might be an issue that needs to be taken into account.

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Geological indicators of flooding
In floodplain deposits, groundwater level can be influenced by the water level in the adjacent river. Groundwater level may increase during periods of fluvial flood and therefore this should be taken into account when designing infiltration systems on such deposits. The *geological indicators of flooding* dataset shows where there is geological evidence (floodplain deposits) that flooding has occurred in the past.

For further information on flood-risk, the likely frequency of its recurrence in relation to any proposed development of the site, and the status of any flood prevention measures in place, you are advised to contact the local office of the Environment Agency (England and Wales) at www.environment-agency.gov.uk/ or the Scottish Environment Protection Agency (Scotland) at www.sepa.org.uk.

Artificial ground
Artificial ground comprises deposits and excavations that have been created or modified by human activity. It includes ground that is worked (quarries and road cuttings), infilled (back-filled quarries), landscaped (surface re-shaping), disturbed (near surface mineral workings) or classified as made ground (embankments and spoil heaps). The composition and properties of artificial ground are often unknown. In particular, the permeability and chemical composition of the artificial ground should be determined to ensure that the ground will drain and that any contaminants present will not be remobilised.

Superficial permeability
Superficial deposits are those geological deposits that were formed during the most recent period of geological time (as old as 2.6 million years before present). They generally comprise relatively thin deposits of gravel, sand, silt and clay and are present beneath the pedological soil in patches or larger spreads over much of Britain. The ease with which water can percolate through these deposits is controlled by their permeability and varies widely depending on their composition. Those deposits comprising clays and silts are less permeable and thus infiltration is likely to be slow, such that water may pool on the surface. In comparison, deposits comprising sands and gravels are more permeable allowing water to percolate freely.

Bedrock permeability
Bedrock forms the main mass of rock forming the Earth. It is present everywhere, commonly beneath superficial deposits. Where the superficial deposits are thin or absent, the ease with which water will percolate into the ground depends on the permeability of the bedrock.

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Natural ground instability
Natural ground instability refers to the propensity for upward, lateral or downward movement of the ground that can be caused by a number of natural geological hazards (e.g. ground dissolution/compressible ground). Some movements associated with particular hazards may be gradual and of millimetre or centimetre scale, whilst others may be sudden and of metre or tens of metres scale. Significant natural ground instability has the potential to cause damage to buildings and structures, especially when the drainage characteristics of a site are altered. It should be noted, however, that many buildings, particularly more modern ones, are built to such a standard that they can remain unaffected in areas of significant ground movement.

Shrink-swell
A shrinking and swelling clay changes volume significantly according to how much water it contains. All clay deposits change volume as their water content varies, typically swelling in winter and shrinking in summer, but some do so to a greater extent than others. Contributory circumstances could include drought, leaking service pipes, tree roots drying-out the ground or changes to local drainage patterns, such as the creation of soakaways. Shrinkage may remove support from the foundations of buildings and structures, whereas clay expansion may lead to uplift (heave) or lateral stress on part or all of a structure; any such movements may cause cracking and distortion.

Landslides (slope stability)
A landslide is a relatively rapid outward and downward movement of a mass of ground on a slope, due to the force of gravity. A slope is under stress from gravity but will not move if its strength is greater than this stress. If the balance is altered so that the stress exceeds the strength, then movement will occur. The stability of a slope can be reduced by removing ground at the base of the slope, by placing material on the slope, especially at the top, or by increasing the water content of the materials forming the slope. Increase in subsurface water content beneath a soakaway could increase susceptibility to landslide hazards. The assessment of landslide hazard refers to the stability of the present land surface. It does not encompass a consideration of the stability of excavations.

Soluble rocks (dissolution)
Some rocks are soluble in water and can be progressively removed by the flow of water through the ground. This process tends to create cavities, potentially leading to the collapse of overlying materials and possibly subsidence at the surface. The release of water into the subsurface from infiltration systems may increase the dissolution of rock or destabilise material above or within a cavity. Dissolution cavities may create a pathway for rapid transport of contaminated water to an aquifer or water course.

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Compressible ground
Many ground materials contain water-filled pores (the spaces between solid particles). Ground is compressible if a building (or other load) can cause the water in the pore space to be squeezed out, causing the ground to decrease in thickness. If ground is extremely compressible the building may sink. If the ground is not uniformly compressible, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The compressibility of the ground may alter as a result of changes in subsurface water content caused by the release of water from soakaways.

Collapsible deposits
Collapsible ground comprises certain fine-grained materials with large pore spaces (the spaces between solid particles). It can collapse when it becomes saturated by water and/or a building (or other structure) places too great a load on it. If the material below a building collapses it may cause the building to sink. If the collapsible ground is variable in thickness or distribution, different parts of the building may sink by different amounts, possibly causing tilting, cracking or distortion. The subsurface underlying a soakaway will experience an increase in water content that may affect the stability of the ground. This hazard is most likely to be encountered only in parts of southern England.

Running sand
Running sand conditions occur when loosely-packed sand, saturated with water, flows into an excavation, borehole or other type of void. The pressure of the water filling the spaces between the sand grains reduces the contact between the grains and they are carried along by the flow. This can lead to subsidence of the surrounding ground. Running sand is potentially hazardous during the drainage system installation. During installation, excavation of the ground may create a space into which sand can flow, potentially causing subsidence of surrounding ground.

Shallow mining hazards (non coal)
Current or past underground mining for coal or for other commodities can give rise to cavities at shallow or intermediate depths, which may cause fracturing, general settlement, or the formation of crown-holes in the ground above. Spoil from mineral workings may also present a pollution hazard. The release of water into the subsurface from soakaways may destabilise material above or within a cavity. Cavities arising as a consequence of mining may also create a pathway for rapid transport of contaminated water to an aquifer or watercourse. The mining hazards map is derived from the geological map and considers the potential for subsidence associated with mining on the basis of geology type. Therefore if mining is known to occur within a certain rock, the map will highlight the potential for a hazard within the area covered by that geology.

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For more information regarding underground and opencast **coal mining**, the location of mine entries (shafts and adits) and matters relating to subsidence or other ground movement induced by **coal mining** please contact the Coal Authority, Mining Reports, 200 Lichfield Lane, Mansfield, Nottinghamshire, NG18 4RG; telephone 0845 762 6848 or at www.coal.gov.uk**.** For more information regarding other types of mining (i.e. non-coal), please contact the British Geological Survey.

Groundwater source protection zones

In England and Wales, the Environment Agency has defined areas around wells, boreholes and springs that are used for the abstraction of public drinking water as source protection zones. In conjunction with Groundwater Protection Policy the zones are used to restrict activities that may impact groundwater quality, thereby preventing pollution of underlying aquifers, such that drinking water quality is upheld. The Environment Agency can provide advice on the location and implications of source protection zones in your area (www.environment-agency.gov.uk/)

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- Detail, which is clearly defined and accurately depicted on large-scale maps, may be lost when small-scale maps are derived from them.
- Although samples and records are maintained with all reasonable care, there may be some deterioration in the long term.
- The most appropriate techniques for copying original records are used, but there may be some loss of detail and dimensional distortion when such records are copied.
- Data may be compiled from the disparate sources of information at BGS's disposal, including material donated to BGS by third parties, and may not originally have been subject to any verification or other quality control process.
- Data, information and related records, which have been donated to BGS, have been produced for a specific purpose, and that may affect the type and completeness of the data recorded and any interpretation. The nature and purpose of data collection, and the age of the resultant material may render it unsuitable for certain applications/uses. You must verify the suitability of the material for your intended usage.
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- The topography shown on any map extracts is based on the latest OS mapping and is not necessarily the same as that used in the original compilation of the BGS geological map, and to which the geological linework available at that time was fitted.
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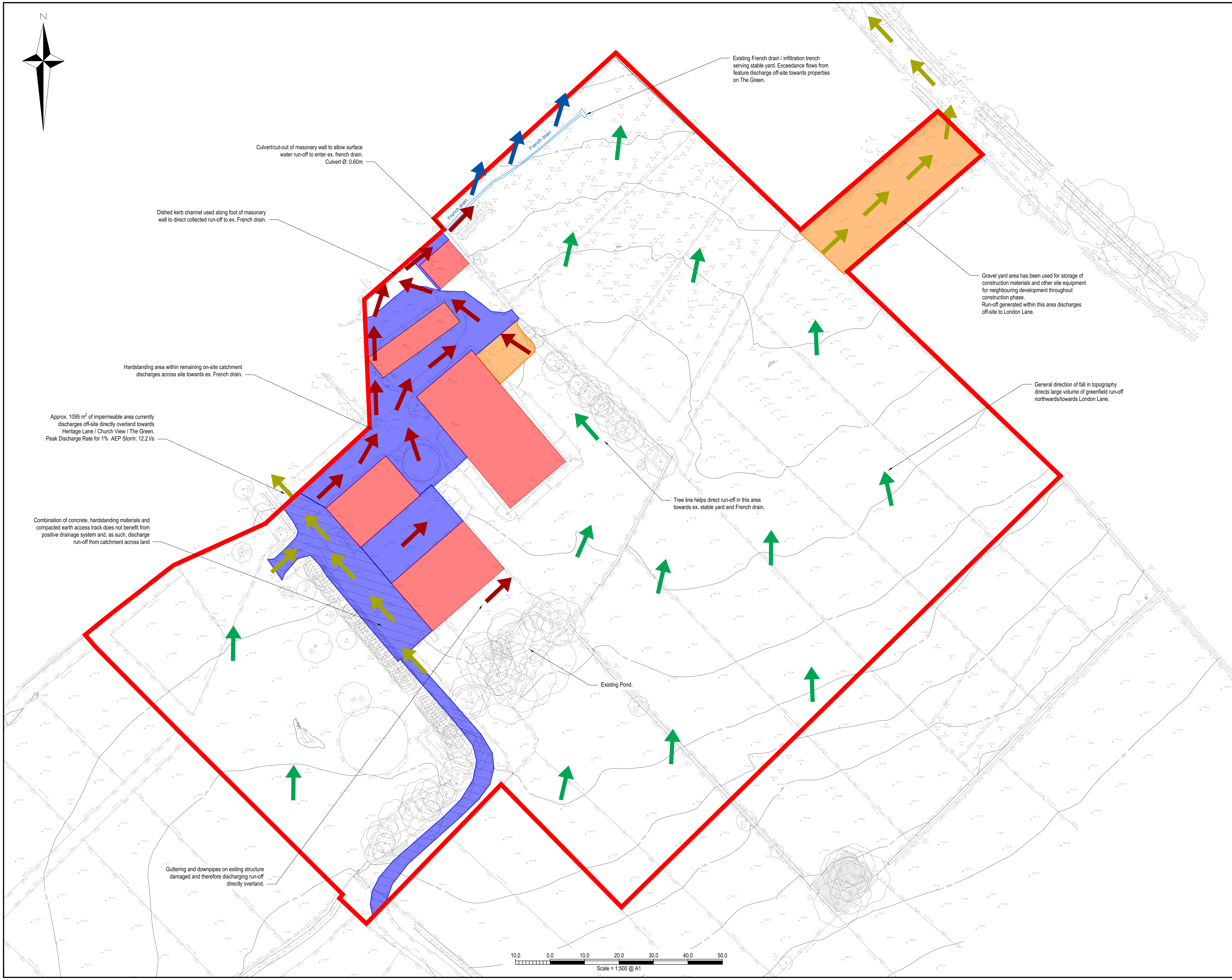
Appendix G

Existing Drainage Catchment Areas & Brownfield Run-off Rate Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. Sewer runs and SuDS features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Existing Structures Draining On-site: Roof Area = 2045m^2
- Existing Hardstanding/Compacted Areas Draining On-site: Impermeable Area = 2031m^2
- Existing Hardstanding/Compacted Areas Draining Off-site: Impermeable Area = 1095m^2
- Total Impermeable Area = 5171m^2
- Existing Gravel/Construction Storage Areas: Semi-Permeable Area = 1083m^2
- Existing Run-off Flow Path - Retained On-site
- Existing Run-off Flow Path - Flows Off-site
- Topographical Direction of Fall
- Exceedance Flow Route - Existing French Drain

Rev.	Description	Date	Chkd
P3	Issued with Technical Note.	18/01/24 SM	JB/CS
P2	Updated for Appeal.	09/01/24 SM	JB
P1	Produced for Planning.	13/10/2023 JD	JB

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Client : Obsidian Strategic Asset Management

Project : Land off London Lane, Ascott-under-Wychwood

Title : Existing Impermeable Areas & Drainage Regime

Project Engineer :	S McNair	Scale :	1:500 @ A1
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK07 Rev P3

General Inputs

Site Location	Ascott-under-Wychwood OFF-SITE DISCHARGE
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	1095
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method:	*Wall. procedure*	*Z1 * M5-60*	*Wall. procedure*	*Z2 * M5-D*	*M100-D / D*	*D * Q_{BAR}*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**3.9**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**4.9**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**9.3**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**12.2**

General Inputs

Site Location	Ascott-under-Wychwood ON-SITE DISCHARGE
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	4076
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method:	*Wall. procedure*	*Z1 * M5-60*	*Wall. procedure*	*Z2 * M5-D*	*M100-D / D*	*D * Q_{BAR}*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**14.3**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**18.2**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**34.5**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**45.5**

General Inputs

Site Location	Ascott-under-Wychwood ENTIRE BF AREA
Hydrological Region	6
SAAR (mm)	750
Soil Type	
SPR	0.45
M5-60 (mm)	19.8
r	0.35
Total impermeable area (m^2)	5171
Runoff coefficient	1
Total site area (m^2)	13390
$QBAR_{rural}$ (l/s)	**6.4**

Rainfall Calculation

Method:	*Wall. procedure*	*Z1 * M5-60*	*Wall. procedure*	*Z2 * M5-D*	*M100-D / D*	*D * Q $_{BAR}$*

1 in 1 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 1)	M1-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.64	12.672	12.672	**18.2**

1 in 2 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 2)	M2-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	0.81	16.038	16.038	**23.0**

1 in 30 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 30)	M30-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	1.54	30.492	30.492	**43.8**

1 in 100 YEAR

Storm Duration D (min)	Z1	M5-D (mm)	Z2 (1 in 100)	M100-D (mm)	Rainfall Intensity i (mm/hr)	Runoff (l/s)
60	1.00	19.8	2.03	40.194	40.194	**57.7**

Appendix H

Statement to LPA by Chris Badger, Former Tenant Farmer at Crown Farm

APPENDIX 4

Statement to the LPA by Chris Badger, former tenant farmer at Crown Farm.

"As far as water is concerned, I believe there are two problems; the first, where the planning application is proposed is very wet especially in the winter months. When I had the livery at the farm we would not put horses out in this field between November and March. There are places that hold water permanently through a normal winter. There are no springs erupting in the field itself, but I believe there are some underground. The pond just above the top building at Crown Farm is full of water during the winter months with the overflow going into a stone drain then into the main drain taking the water from the indoor school, around the building and into the village by the main entrance to the farm.

The second water problem is water coming down the Leafield Road crossing the B4437 and then heading down the road in the direction of the farm (called New Road), down through to farm buildings and finishing up by Crown Barn boundary.

When I was at the farm, I put a bump in the road to divert the water coming down New Road, around the outdoor school and into the brash ground. However, I also kept the ditches on the roadside verges clear thus minimising the water coming from Fairspear. This obviously must be maintained which is not happening today. Also, I put in a soakaway pit just above Crown Barn House to try and alleviate any problems in extreme conditions.

Over the years, the pit silted up so before I moved to 3 The Green, I dug a trench across the field and filled it with shingle to help delay any silting up. The trench then continued to a soakaway just above my neighbour John Cull at 1 The Green. This does work in normal conditions but in extreme conditions, even this overflows.

As a result of localised flooding and to prevent water entering homes:

- *7 The Green has a pump*
- *The Green has sandbags*
- *3 The Green has a pump*
- *1 The Green has a pump*

These are the precautions we need to take to pump excess water heading for the houses and divert towards the area of the Village Green.

This only goes to prove a water drainage problem exists as maintenance of the roadside verges does not really exist as does the hump in New Road. Any blockages that occur i.e., guttering overflow, drains blocked only add to the situation. Therefore, there is a huge concern with more tarmac and roof water adding to our problems. In simple terms, water only knows one way to go, and that increasingly looks like a one way route through our houses.

Chris Badger – 3 The Green (previously Crown Farm)"

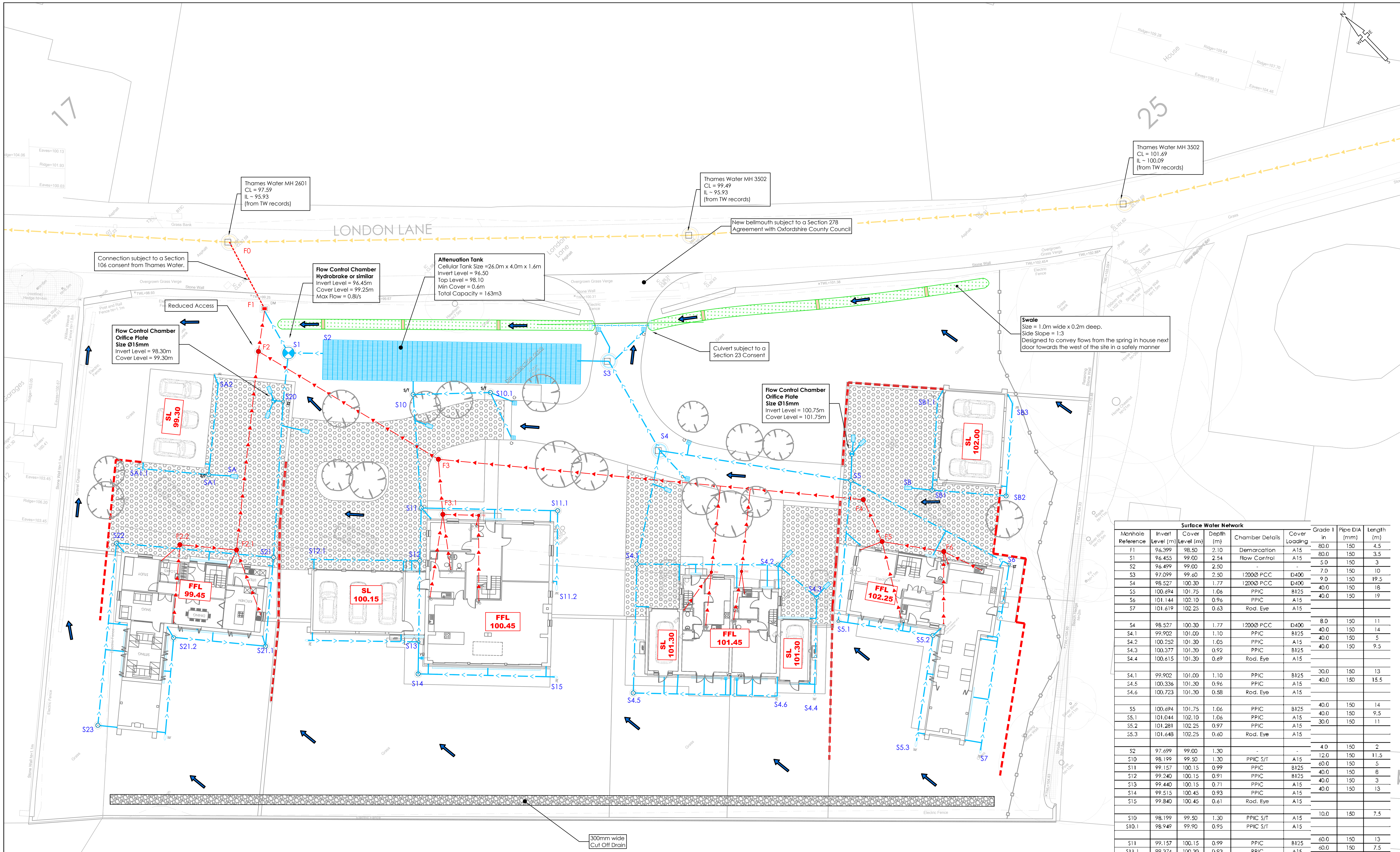
Appendix I

Location of Watercourses, Springs & Ponds in Vicinity of Site

Location of Watercourses, Springs & Ponds in Vicinity of Site

Appendix J

Approved Drainage Design for Foresters Court, London Lane



Drainage Key

Sewers

	Foul water drain (private/non adoptable)
	Surface water drain (private/non adoptable)
	Existing foul water sewer (Adopted)
	Existing combined water sewer (Adopted)
	Proposed combined water sewer (Adoptable)

Chamber Key

FW/SW

FW	SW	Description
mac	mac	Mini access chamber (mac) - 300mmØ
		PPIC - 475mmØ*
		P.C.C. units/brick*
DM	DM	Adoptable demarcation manhole within 1m of boundary
		Manhole Depth: 1.25m to 1.5m* Depth: 1.55m to 3.0m*

* General note
(Refer to standard details & longitudinal sections for chamber sizes. Size may need to increase dependant on number of incoming pipes/size of incoming pipes)

RE	Surface water rodding eye
	Rain water down pipe (roddable access)
	Soil vent pipe/soil stack
ST	Silt Trap (ST) with removable silt bucket
S1/F1	Manhole reference number
yg	Yard gully (150mm - 200mmØ trapped)
G	Road gully (trapped) D400
fg	Floor gully (trapped)
S	Surface water sump unit
	Linear drainage channel
	Cellular storage (refer to drawing for sizes)
	RWP cellular discharge/collection unit
	Headwall
	Tree root protection zone (RPZ)
	Impermeable barrier to stop lateral movement of water
FFL XX.XX	Finished Floor Level (FFL)
	Permeable Gravel
	Flood exceedance routing

Surface Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade 1 in	Pipe DIA (mm)	Length (m)
F1	96.399	98.50	2.10	Demarcation	A15	80.0	150	4.5
S1	96.455	99.00	2.54	Flow Control	A15	80.0	150	3.5
S2	96.499	99.00	2.50	-	-	5.0	150	3
S3	97.099	99.60	2.50	1200Ø PCC	D400	7.0	150	10
S4	98.527	100.30	1.77	1200Ø PCC	D400	9.0	150	19.5
S5	100.694	101.75	1.06	PPIC	B125	40.0	150	18
S6	101.144	102.10	0.96	PPIC	A15	40.0	150	19
S7	101.619	102.25	0.63	Rod. Eye	A15			
S4	98.527	100.30	1.77	1200Ø PCC	D400	8.0	150	11
S4.1	99.902	101.00	1.10	PPIC	B125	40.0	150	14
S4.2	100.252	101.30	1.05	PPIC	A15	40.0	150	5
S4.3	100.377	101.30	0.92	PPIC	B125	40.0	150	9.5
S4.4	100.615	101.30	0.69	Rod. Eye	A15			
S4.1	99.902	101.00	1.10	PPIC	B125	30.0	150	13
S4.5	100.336	101.30	0.96	PPIC	A15	40.0	150	15.5
S4.6	100.723	101.30	0.58	Rod. Eye	A15			
S5	100.694	101.75	1.06	PPIC	B125	40.0	150	14
S5.1	101.044	102.10	1.06	PPIC	A15	40.0	150	9.5
S5.2	101.281	102.25	0.97	PPIC	A15	30.0	150	11
S5.3	101.648	102.25	0.60	Rod. Eye	A15			
S2	97.699	99.00	1.30	-	-	4.0	150	2
S10	98.199	99.50	1.30	PPIC S/T	A15	12.0	150	11.5
S11	99.157	100.15	0.99	PPIC	B125	60.0	150	5
S12	99.240	100.15	0.91	PPIC	B125	40.0	150	8
S13	99.440	100.15	0.71	PPIC	A15	40.0	150	3
S14	99.515	100.45	0.93	PPIC	A15	40.0	150	13
S15	99.840	100.45	0.61	Rod. Eye	A15			
S10	98.199	99.50	1.30	PPIC S/T	A15	10.0	150	7.5
S10.1	98.949	99.90	0.95	PPIC S/T	A15			
S11	99.157	100.15	0.99	PPIC	B125	60.0	150	13
S11.1	99.374	100.30	0.93	PPIC	A15	60.0	150	7.5
S11.2	99.499	100.30	0.80	Rod. Eye	A15			
S12	99.240	100.15	0.91	PPIC	B125	40.0	150	10.5
S12.1	99.503	100.15	0.65	Rod. Eye	B125			
S1	96.455	99.00	2.54	Flow Control	A15	4.0	150	5
S20	97.705	99.30	1.59	PPIC	B125	40.0	150	16
S21	98.105	99.30	1.19	PPIC	B125	60.0	150	16
S22	98.372	99.30	0.93	PPIC	B125	60.0	150	19
S23	98.688	99.30	0.61	PPIC	A15			
S21	98.105	99.30	1.19	PPIC	B125	60.0	150	9
S21.1	98.255	99.30	1.04	PPIC	A15	60.0	150	9
S21.2	98.405	99.30	0.89	PPIC	A15	60.0	150	10
S21.3	98.572	99.30	0.73	Rod. Eye	A15			
SA	98.750	99.30	0.55	-	-	80.0	100	2
SA1	98.775	99.30	0.52	PPIC S/T	B125	80.0	100	9.5
SA2	98.894	99.30	0.41	Rod. Eye	B125			
			0.00					
SA1	98.775	99.30	0.52	PPIC S/T	B125	80.0	100	7
SA1.1	98.863	99.30	0.44	Rod. Eye	B125			
SB	101.350	101.90	0.55	-	-	80.0	100	2
SB1	101.375	102.00	0.63	PPIC S/T	B125	80.0	100	7
SB2	101.463	102.50	1.04	PPIC	A15	80.0	100	9.5
SB3	101.581	102.50	0.92	Rod. Eye	A15			
SB1	101.375	102.00	0.63	PPIC S/T	B125	80.0	100	9
SB1.1	101.488	102.00	0.51	Rod. Eye	B125			

Foul Water Network

Manhole Reference	Invert Level (m)	Cover Level (m)	Depth (m)	Chamber Details	Cover Loading	Grade 1 in	Pipe DIA (mm)	Length (m)
F0	95.930	97.59	1.66	Existing	-	16.0	150	7.5
F1	96.399	98.50	2.10	Demarcation	A15	5.0	100	4
F2	97.249	99.00	1.75	PPIC	A15	12.0	100	21
F3	98.999	100.10	1.10	PPIC	A15	25.0	100	43
F4	100.719	101.75	1.03	PPIC	B125	7.0	100	4.5
F5	101.362	102.25	0.89	PPIC	B125	60.0	100	6.5
F6	101.470	102.25	0.78	PPIC	B125			
F2	97.249	99.00	1.75	PPIC	A15	15.0	100	20
F2.1	98.582	99.45	0.87	PPIC	B125	30.0	100	5
F2.2	98.749	99.45	0.70	PPIC	B125			
F3	98.999	100.10	1.10	PPIC	A15	15.0	100	5.5
F3.1	99.365	100.20	0.83	PPIC	B125			

CDM RESIDUAL RISK ITEM
Existing services likely within working area. Danger to site personnel and general public

CDM RESIDUAL RISK ITEM
Contact with waste water when making drainage connections.
Risk of infection from Weils disease etc.

CDM RESIDUAL RISK ITEM
Works within confined spaces.

DESIGNER NOTE

Groundwater was not found within 20m during the investigation carried out by GIS Southern in November 2019. Only seepage was found in two locations at depths of 1.85m and 1.90m. The results of the permeability testing indicate very low values with insufficient data to allow calculation of an infiltration rate.

DESIGNER NOTE

CBR value between of 2.5% taken from site investigation Report Ref S.5429 undertaken by GIS Southern in November 2019

DESIGNER NOTE

SuDS features sized for a 1 in 100 year event + 40% Climate Change

DESIGNER NOTE

Access to existing inspection chambers to be maintained

DESIGNER NOTE

SVP's and RWP's locations subject to confirmation from the Architect.

REV	REVISION DETAILS	DATE	DRAWN BY
P03	Threshold channels and external taps added.	20/01/21	MBD
P02	Updated with latest plans. Drainage amended to suit	19/01/21	AC
P01	Initial issue	20/11/20	MBD

CLIENT: Kingerlee Homes

ORIGINATOR: SWJ

PROJECT: 5 Units, London Lane, Ascott Under Wychwood

TITLE: Drainage Design

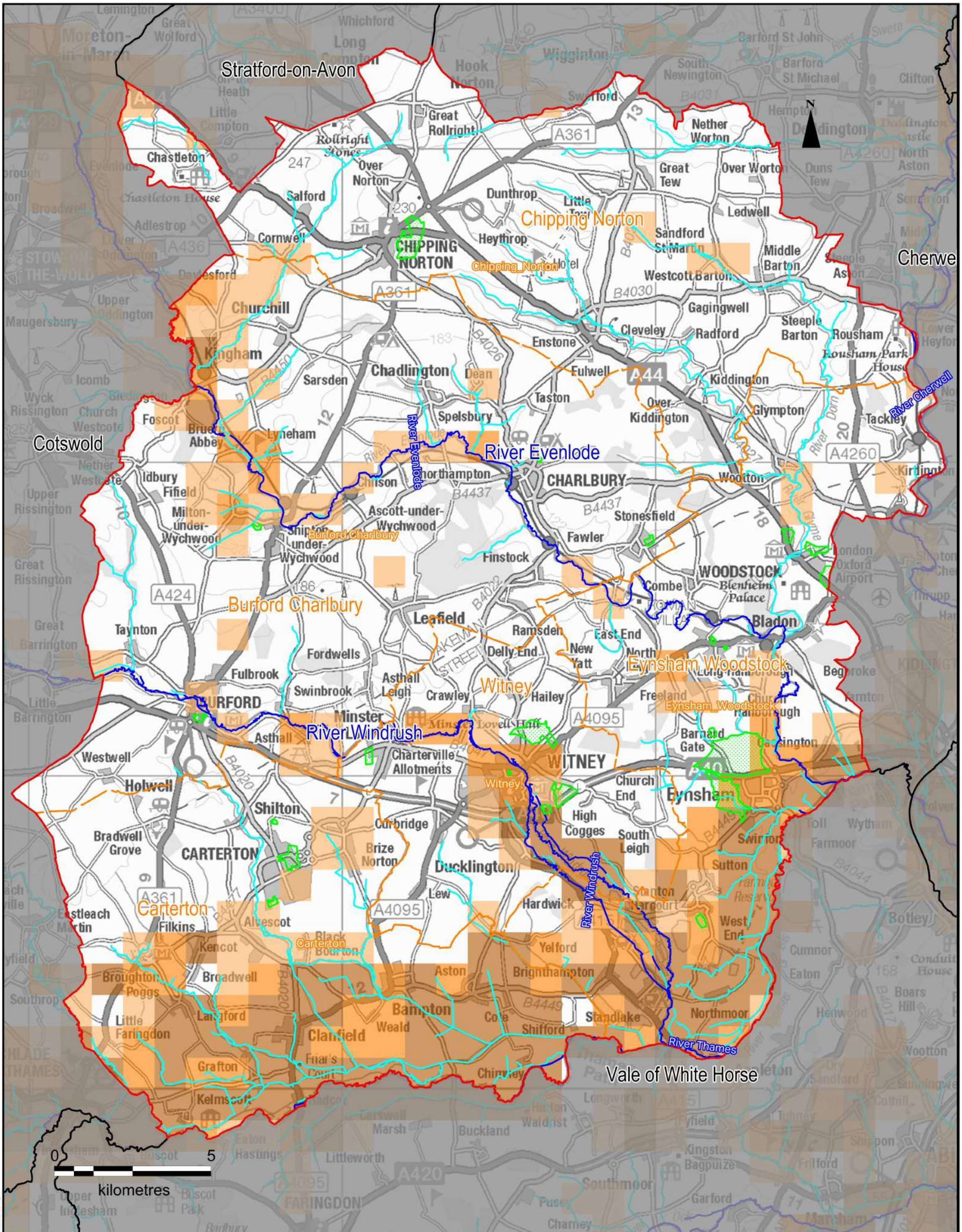
SCALE	DRAWN	CHECKED	APPROVED
1:200 @A1	AC	MBD	RJW

PROJECT	ORIGINATOR	ZONE	LEVEL	TYPE	ROLE	DOC NO
01255	SWJ	XX	XX	DR	C	0200

JOB NO.	PURPOSE OF ISSUE	STATUS:	REVISION:
01255	FOR INFORMATION	S2	P03

Appendix K

Areas Susceptible to Groundwater Flooding (ASTGWF) Map



LEGEND

- West Oxfordshire District Boundary
- LP Potential Development Sites
- West Oxfordshire Sub-boundaries
- Main Rivers
- Ordinary Watercourses

Areas Susceptible to Groundwater Flooding

< 25%	(2142)
>= 25% <50%	(594)
>= 50% <75%	(353)
>= 75%	(427)

Notes

The 1:50,000 scale digital map data is generalised and the geological interpretation should be used only as a guide to the geology at a local level, not as a site-specific geological plan based on detailed site investigations.

Intended Use

This map is intended to provide a strategic overview of susceptibility to groundwater flooding and should not be used to assess flood risk for individual properties.

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Revision Details	SEB / EC	Nov 2016	Suffix

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Scale at A3: 1:110,000

Drawn SEB | Checked SL

Approved EC | Date November 2016

Purpose of Issue: FINAL ISSUE

Project Title: WEST OXFORDSHIRE COUNCIL STRATEGIC FLOOD RISK ASSESSMENT

Drawing Title: AREAS SUSCEPTIBLE TO GROUNDWATER FLOODING (ASTGWF)

AECOM Internal Project No. 60505363

Client: WEST OXFORDSHIRE DISTRICT COUNCIL

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AECOM

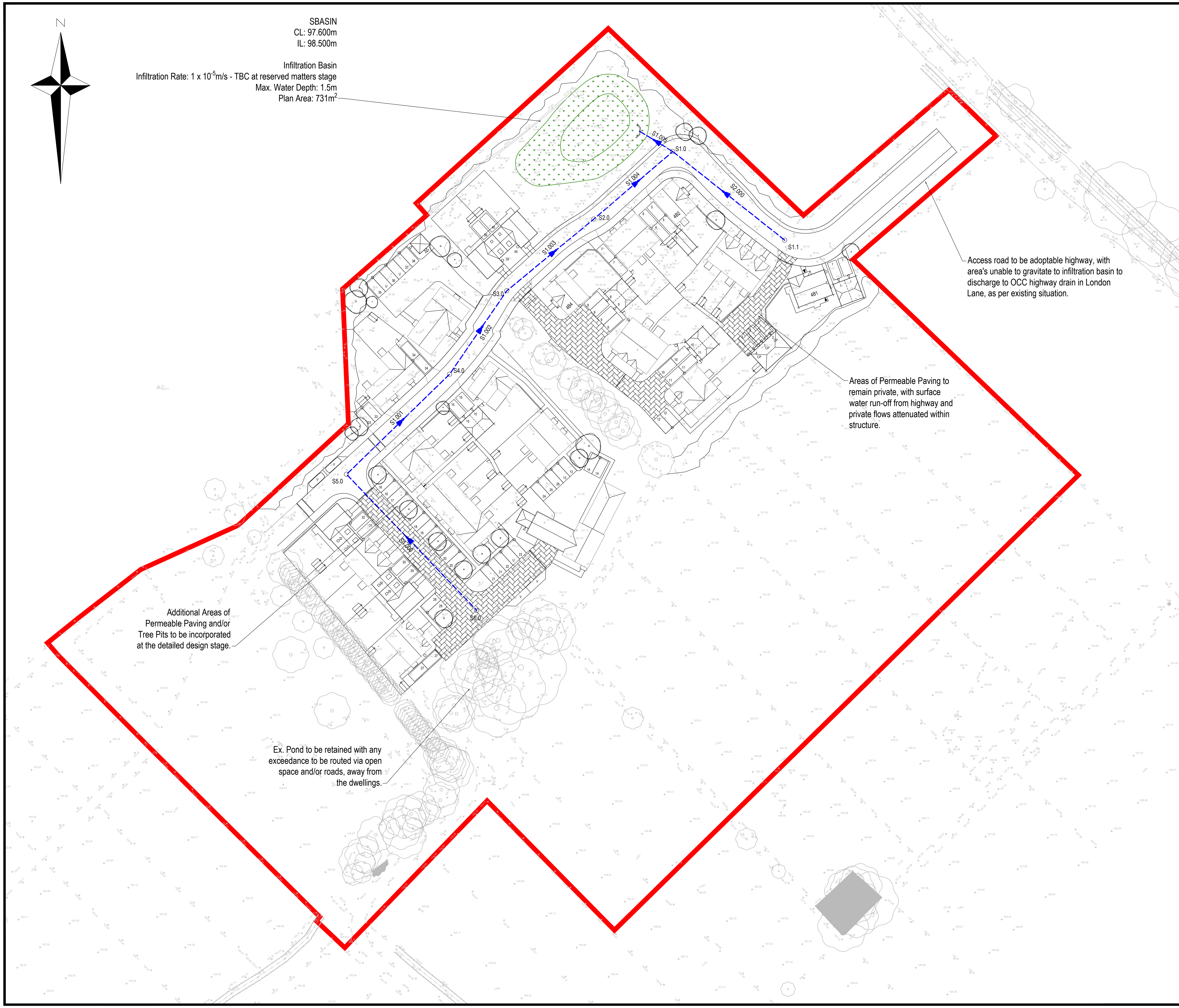
Drawing Number: FIGURE 6

Rev: 02

N:\Water\Current Projects\60505363 WODC SFRA update\06 GIS\WOR

Appendix L

Outline Surface Water Drainage Strategy & Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. Sewer runs and SuDS features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- - - - -	Surface Water Sewer
○	Surface Water Manhole
	Headwall
S2.000	MicroDrainage Pipe Reference Direction of Flow
	Proposed Permeable Paving with Deepened Porous Sub-base
	Infiltration Basin

Rev.	Description	Date	Chkd
P1	Issued to Client.	05/05/2023 SM	JB

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Client : Obsidian Strategic Asset Management

Project : Land off London Lane, Ascott-under-Wychwood

Title : Outline Surface Water Drainage Strategy

Project Engineer :	S McNair	Scale :	1:1000 @ A3
Project Director :	J Birch	Date :	May 2023
Status :	PRELIMINARY		

Drawing No. 8211067 - SK03 Rev P1

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

« - Indicates pipe capacity < flow

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	51.779	0.885	58.5	0.073	10.00	0.0	0.600	o	150	Pipe/Conduit	
S1.001	39.335	0.675	58.3	0.139	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.002	27.886	0.475	58.7	0.112	0.00	0.0	0.600	o	225	Pipe/Conduit	
S1.003	30.953	0.530	58.4	0.161	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.004	28.496	0.985	28.9	0.054	0.00	0.0	0.600	o	300	Pipe/Conduit	
S2.000	39.237	0.350	112.1	0.089	10.00	0.0	0.600	o	150	Pipe/Conduit	
S1.005	14.566	0.100	145.7	0.083	0.00	0.0	0.600	o	300	Pipe/Conduit	
S1.006	6.055	0.105	57.7	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	50.00	10.66	101.100	0.073	0.0	0.0	0.0	1.32	23.3	11.9
S1.001	50.00	11.04	100.140	0.212	0.0	0.0	0.0	1.72	68.3	34.4
S1.002	50.00	11.31	99.465	0.324	0.0	0.0	0.0	1.71	68.0	52.6
S1.003	50.00	11.56	98.915	0.485	0.0	0.0	0.0	2.06	145.7	78.8
S1.004	50.00	11.72	98.385	0.539	0.0	0.0	0.0	2.93	207.4	87.6
S2.000	50.00	10.69	97.900	0.089	0.0	0.0	0.0	0.95	16.8	14.5
S1.005	50.00	11.91	97.400	0.711	0.0	0.0	0.0	1.30	91.9«	115.5
S1.006	50.00	11.96	95.800	0.711	0.0	0.0	0.0	2.07	146.6	115.5

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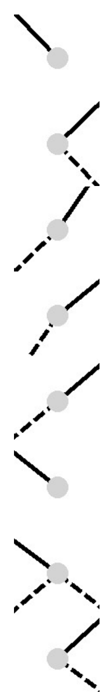
Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S6.0	102.500	1.400	Open Manhole	1200	S1.000	101.100	150				
S5.0	101.500	1.360	Open Manhole	1200	S1.001	100.140	225	S1.000	100.215	150	
S4.0	101.400	1.935	Open Manhole	1200	S1.002	99.465	225	S1.001	99.465	225	
S3.0	101.300	2.385	Open Manhole	1200	S1.003	98.915	300	S1.002	98.990	225	
S2.0	99.750	1.365	Open Manhole	1200	S1.004	98.385	300	S1.003	98.385	300	
S1.1	99.300	1.400	Open Manhole	1200	S2.000	97.900	150				
S1.0	98.600	1.200	Open Manhole	1200	S1.005	97.400	300	S1.004	97.400	300	
								S2.000	97.550	150	
SBASIN	97.600	1.800	Open Manhole	1200	S1.006	95.800	300	S1.005	97.300	300	1500
S	99.000	3.305	Open Manhole	150		OUTFALL		S1.006	95.695	300	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S6.0	430148.840	218483.280	430148.840	218483.280	Required	
S5.0	430113.034	218520.684	430113.034	218520.684	Required	
S4.0	430141.304	218548.035	430141.304	218548.035	Required	
S3.0	430157.023	218571.069	430157.023	218571.069	Required	
S2.0	430180.928	218590.732	430180.928	218590.732	Required	
S1.1	430233.377	218584.951	430233.377	218584.951	Required	
S1.0	430202.578	218609.260	430202.578	218609.260	Required	
SBASIN	430190.912	218617.982	430190.912	218617.982	Required	



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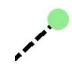
Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S	430195.367	218622.083			No Entry	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S6.0	102.500	101.100	1.250	Open Manhole	1200
S1.001	o	225	S5.0	101.500	100.140	1.135	Open Manhole	1200
S1.002	o	225	S4.0	101.400	99.465	1.710	Open Manhole	1200
S1.003	o	300	S3.0	101.300	98.915	2.085	Open Manhole	1200
S1.004	o	300	S2.0	99.750	98.385	1.065	Open Manhole	1200
S2.000	o	150	S1.1	99.300	97.900	1.250	Open Manhole	1200
S1.005	o	300	S1.0	98.600	97.400	0.900	Open Manhole	1200
S1.006	o	300	SBASIN	97.600	95.800	1.500	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	51.779	58.5	S5.0	101.500	100.215	1.135	Open Manhole	1200
S1.001	39.335	58.3	S4.0	101.400	99.465	1.710	Open Manhole	1200
S1.002	27.886	58.7	S3.0	101.300	98.990	2.085	Open Manhole	1200
S1.003	30.953	58.4	S2.0	99.750	98.385	1.065	Open Manhole	1200
S1.004	28.496	28.9	S1.0	98.600	97.400	0.900	Open Manhole	1200
S2.000	39.237	112.1	S1.0	98.600	97.550	0.900	Open Manhole	1200
S1.005	14.566	145.7	SBASIN	97.600	97.300	0.000	Open Manhole	1200
S1.006	6.055	57.7	S	99.000	95.695	3.005	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.073	0.073	0.073
1.001	-	-	100	0.139	0.139	0.139
1.002	-	-	100	0.112	0.112	0.112
1.003	-	-	100	0.161	0.161	0.161
1.004	-	-	100	0.054	0.054	0.054
2.000	-	-	100	0.089	0.089	0.089
1.005	-	-	100	0.083	0.083	0.083
1.006	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.711	0.711	0.711

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.006	S	99.000	95.695	95.695	150	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.900	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coeffiecient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	4	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	1999
Site Location	GB 430500 218950 SP 30500 18950
C (1km)	-0.019
D1 (1km)	0.352
D2 (1km)	0.281
D3 (1km)	0.278
E (1km)	0.277
F (1km)	2.498
Summer Storms	Yes

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Synthetic Rainfall Details

Winter Storms	Yes
Cv (Summer)	0.900
Cv (Winter)	0.840
Storm Duration (mins)	30

Online Controls for Storm

Weir Manhole: SBASIN, DS/PN: S1.006, Volume (m³): 3.0

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 97.600

Storage Structures for Storm

Porous Car Park Manhole: S5.0, DS/PN: S1.001

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.8
Membrane Percolation (mm/hr)	1000	Length (m)	49.0
Max Percolation (l/s)	65.3	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	100.140	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S3.0, DS/PN: S1.003

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	4.2
Membrane Percolation (mm/hr)	1000	Length (m)	49.0
Max Percolation (l/s)	57.2	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	98.915	Cap Volume Depth (m)	0.600

Porous Car Park Manhole: S1.1, DS/PN: S2.000

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	3.6
Membrane Percolation (mm/hr)	1000	Length (m)	28.0
Max Percolation (l/s)	28.0	Slope (1:X)	50.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	97.900	Cap Volume Depth (m)	0.600

Infiltration Basin Manhole: SBASIN, DS/PN: S1.006

Invert Level (m)	95.800	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.03600	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.03600		

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	222.0	1.800	598.8

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 2 year Summer I+0%	60	102.500	101.152	-0.098	0.000
S1.001	S5.0	60 minute 2 year Summer I+0%	60	101.500	100.221	-0.144	0.000
S1.002	S4.0	60 minute 2 year Summer I+0%	60	101.400	99.569	-0.121	0.000
S1.003	S3.0	60 minute 2 year Summer I+0%	60	101.300	99.030	-0.185	0.000
S1.004	S2.0	60 minute 2 year Summer I+0%	60	99.750	98.486	-0.199	0.000
S2.000	S1.1	60 minute 2 year Summer I+0%	60	99.300	97.970	-0.080	0.000
S1.005	S1.0	60 minute 2 year Summer I+0%	60	98.600	97.602	-0.098	0.000
S1.006	SBASIN	480 minute 2 year Winter I+0%	480	97.600	96.305	0.205	0.000

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	0.26			0.053	7.454		5.9	OK
S1.001	S5.0	0.27		0.0	0.320	20.466	10	17.6	OK
S1.002	S4.0	0.43			0.152	31.874		27.4	OK
S1.003	S3.0	0.31		0.0	0.547	47.289	10	41.2	OK
S1.004	S2.0	0.24			0.154	52.773		45.8	OK
S2.000	S1.1	0.44		0.0	0.205	8.602	10	7.2	OK
S1.005	S1.0	0.77			0.352	69.803		59.3	OK
S1.006	SBASIN	0.00		2.1	134.000	0.000	624	0.0	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	4	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	300.0	DVD Status	OFF
Analysis Timestep	Fine	Inertia Status	OFF
DTS Status	ON		

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 30 year Summer I+0%	60	102.500	101.186	-0.064	0.000
S1.001	S5.0	60 minute 30 year Summer I+0%	60	101.500	100.280	-0.085	0.000
S1.002	S4.0	60 minute 30 year Summer I+0%	60	101.400	99.758	0.068	0.000
S1.003	S3.0	60 minute 30 year Summer I+0%	60	101.300	99.117	-0.098	0.000
S1.004	S2.0	60 minute 30 year Summer I+0%	60	99.750	98.556	-0.129	0.000
S2.000	S1.1	60 minute 30 year Summer I+0%	60	99.300	98.152	0.102	0.000
S1.005	S1.0	60 minute 30 year Summer I+0%	60	98.600	97.938	0.238	0.000
S1.006	SBASIN	480 minute 30 year Winter I+0%	480	97.600	96.723	0.623	0.000

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	0.62			0.091	17.864		14.1	OK
S1.001	S5.0	0.68		0.0	0.879	50.706	10	43.9	OK
S1.002	S4.0	1.08			0.721	78.130		68.1	SURCHARGED
S1.003	S3.0	0.77		0.0	1.572	116.516	10	102.8	OK
S1.004	S2.0	0.61			0.368	129.762		114.4	OK
S2.000	S1.1	1.07		0.0	1.988	21.263	8	17.4	SURCHARGED
S1.005	S1.0	1.86			1.923	171.376		143.0	SURCHARGED
S1.006	SBASIN	0.00		3.0	281.020	0.000	944	0.0	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 4 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	2, 30, 100
Climate Change (%)	0, 0, 40

PN	US/MH Name	Event	Duration (mins)	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)
S1.000	S6.0	60 minute 100 year Summer I+40%	60	102.500	101.674	0.424	0.000
S1.001	S5.0	60 minute 100 year Summer I+40%	60	101.500	100.697	0.332	0.000
S1.002	S4.0	60 minute 100 year Summer I+40%	60	101.400	100.319	0.629	0.000
S1.003	S3.0	60 minute 100 year Summer I+40%	60	101.300	99.405	0.190	0.000
S1.004	S2.0	60 minute 100 year Summer I+40%	60	99.750	98.869	0.184	0.000
S2.000	S1.1	60 minute 100 year Winter I+40%	60	99.300	98.549	0.499	0.000
S1.005	S1.0	60 minute 100 year Summer I+40%	60	98.600	98.223	0.523	0.000
S1.006	SBASIN	960 minute 100 year Winter I+40%	960	97.600	97.294	1.194	0.000

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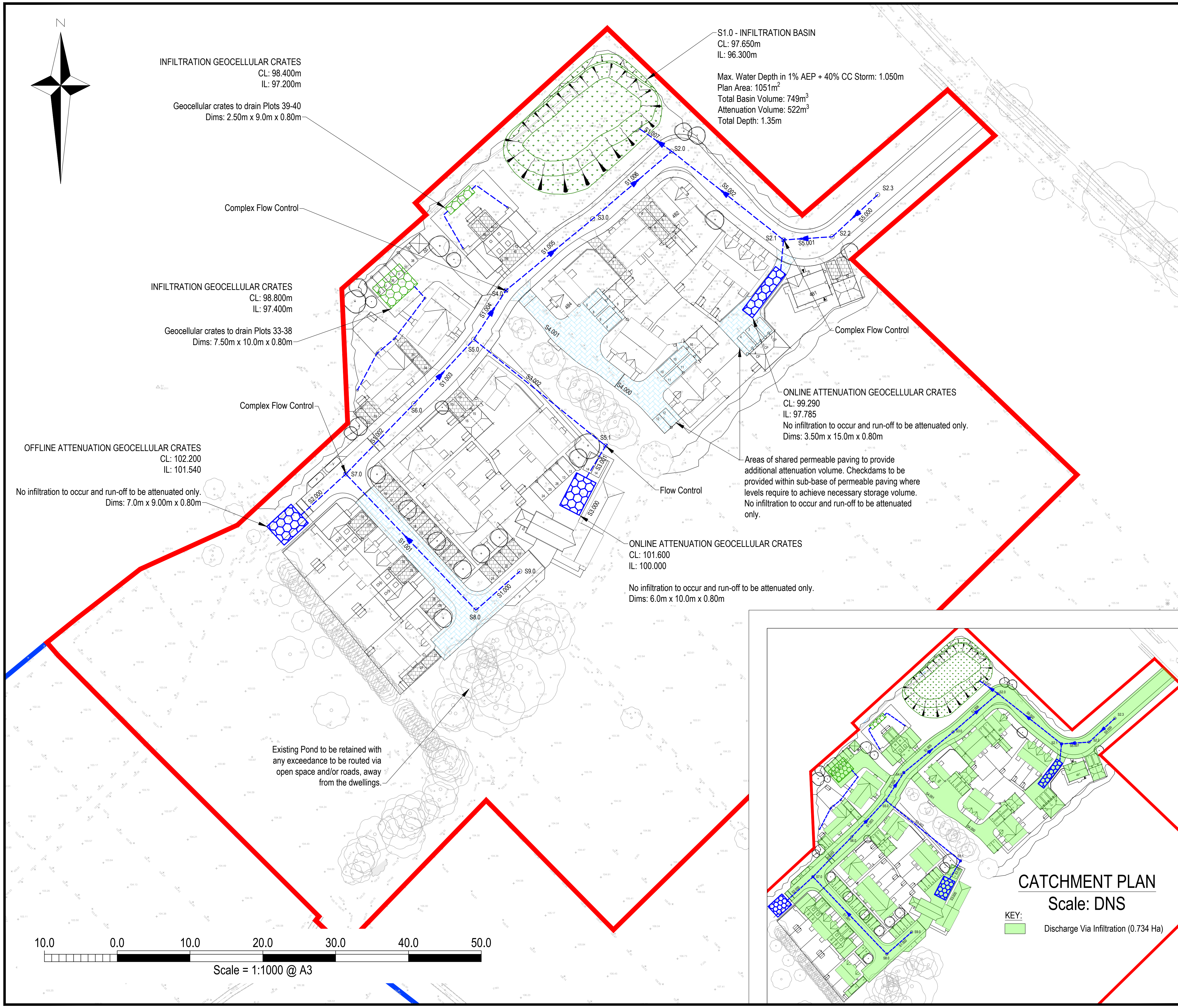
100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Flow / Cap.	Overflow (l/s)	Infil. Flow (l/s)	Maximum Vol (m³)	Discharge Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S6.0	1.05			0.644	32.851		23.8	SURCHARGED
S1.001	S5.0	0.98		0.0	12.185	94.233	10	63.4	SURCHARGED
S1.002	S4.0	1.38			2.456	144.650		87.5	SURCHARGED
S1.003	S3.0	1.03		0.0	8.786	216.093	8	136.1	SURCHARGED
S1.004	S2.0	0.81			1.850	240.414		152.3	SURCHARGED
S2.000	S1.1	1.42		0.0	11.815	44.354	12	23.1	SURCHARGED
S1.005	S1.0	2.50			2.907	317.335		191.8	SURCHARGED
S1.006	SBASIN	0.00		4.3	541.475	0.000	1312	0.0	SURCHARGED

Appendix M

Option 1 – Surface Water Drainage Strategy & Calculations



NOTES

1. Dimensions not to be scaled from this drawing for construction purposes.
2. This drawing should be read in conjunction with the associated Flood Risk Assessment and all relevant standards.
3. All drainage features are indictive only for preliminary design purposes and are subject to detailed design. All levels shown in meters AOD.
4. Site Layout taken from Thrive Architects drawing OBSI180824 CMP_01 P10, dated June 2022.
5. Topographical levels taken from Greenhatch group drawing 42917_T1, dated February 2022.

KEY

- Application Boundary
- Land Under Applicant's Control
- Surface Water Sewer
- Manhole Chamber
- Flow Control Chamber
- Headwall
- MicroDrainage Pipe Reference Direction of Flow (S2.000)
- Infiltration Basin
- Geocellular Crates (Infiltration)
- Proposed Permeable Paving with Deepened Porous Sub-base (Attenuation only)
- Geocellular Crates (Attenuation Only)
- Private Parking Area (Attenuation only)

Rev.	Description	Date	Chkd
P3	Issued with Technical Note.	18/01/2024 SM	JB/CS

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Client : Obsidian Strategic Asset Management

Project : Land off London Lane, Ascott-under-Wychwood

Title : Outline Surface Water Drainage Strategy Option 1 - 100% Infiltration

Project Engineer :	S McNair	Scale :	1:1000 @ A3
Project Director :	J Birch	Date :	January 2024
Status :	PLANNING		

Drawing No. 8211067 - SK03 Rev P3

ICP SUDS Mean Annual Flood

Input

Return Period (years)	100	Soil	0.450
Area (ha)	1.339	Urban	0.000
SAAR (mm)	750	Region Number	Region 6

Results	**l/s**
QBAR Rural	6.4
QBAR Urban	6.4
Q100 years	20.3
Q1 year	5.4
Q30 years	14.5
Q100 years	20.3

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STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FEH Rainfall Model

Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Maximum Rainfall (mm/hr)	50
Maximum Time of Concentration (mins)	30
Foul Sewage (l/s/ha)	0.000
Volumetric Runoff Coeff.	0.900
PIMP (%)	100
Add Flow / Climate Change (%)	0
Minimum Backdrop Height (m)	0.200
Maximum Backdrop Height (m)	1.500
Min Design Depth for Optimisation (m)	1.200
Min Vel for Auto Design only (m/s)	1.00
Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S9.0	102.200	100.800	1.250	Open Manhole	1200
S1.001	o	150	S8.0	102.550	100.650	1.750	Open Manhole	1200
S2.000	o	150	S7.1	102.200	100.400	1.650	Open Manhole	1200
S1.002	o	225	S7.0	101.550	100.215	1.110	Open Manhole	1200
S1.003	o	225	S6.0	101.200	100.080	0.895	Open Manhole	1200
S3.000	o	150	SDummy	103.000	102.000	0.850	Open Manhole	300
S3.001	o	150	S5.2	101.600	100.000	1.450	Open Manhole	1200
S3.002	o	150	S5.1	101.600	99.930	1.520	Open Manhole	1200
S1.004	o	225	S5.0	100.700	99.535	0.940	Open Manhole	1200
S4.000	o	150	S4.2	101.350	100.150	1.050	Open Manhole	1200
S4.001	o	150	S4.1	101.300	99.960	1.190	Open Manhole	1200
S1.005	o	225	S4.0	100.600	99.450	0.925	Open Manhole	1200
S1.006	o	225	S3.0	99.900	98.435	1.240	Open Manhole	1200
S5.000	o	150	S2.3	99.000	97.950	0.900	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	21.113	140.8	S8.0	102.550	100.650	1.750	Open Manhole	1200
S1.001	53.934	149.8	S7.0	101.550	100.290	1.110	Open Manhole	1200
S2.000	16.941	154.0	S7.0	101.550	100.290	1.110	Open Manhole	1200
S1.002	29.878	221.3	S6.0	101.200	100.080	0.895	Open Manhole	1200
S1.003	22.354	41.0	S5.0	100.700	99.535	0.940	Open Manhole	1200
S3.000	11.174	5.6	S5.2	101.600	100.000	1.450	Open Manhole	1200
S3.001	9.699	138.6	S5.1	101.600	99.930	1.520	Open Manhole	1200
S3.002	47.265	147.7	S5.0	100.700	99.610	0.940	Open Manhole	1200
S1.004	17.460	205.4	S4.0	100.600	99.450	0.925	Open Manhole	1200
S4.000	27.305	143.7	S4.1	101.300	99.960	1.190	Open Manhole	1200
S4.001	23.523	54.1	S4.0	100.600	99.525	0.925	Open Manhole	1200
S1.005	24.370	24.0	S3.0	99.900	98.435	1.240	Open Manhole	1200
S1.006	32.737	32.1	S2.0	98.600	97.415	0.960	Open Manhole	1200
S5.000	20.012	148.2	S2.2	99.400	97.815	1.435	Open Manhole	1200

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	o	150	S2.2	99.400	97.815	1.435	Open Manhole	1200
S5.002	o	150	S2.1	99.290	97.785	1.355	Open Manhole	1200
S1.007	o	300	S2.0	98.600	97.340	0.960	Open Manhole	1200
S1.008	o	150	S1	97.650	96.300	1.200	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S5.001	3.995	133.2	S2.1	99.290	97.785	1.355	Open Manhole	1200
S5.002	43.624	147.9	S2.0	98.600	97.490	0.960	Open Manhole	1200
S1.007	8.143	203.6	S1	97.650	97.300	0.050	Open Manhole	1200
S1.008	15.567	103.8	S	100.000	96.150	3.700	Open Manhole	150

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.018	0.018	0.018
1.001	-	-	100	0.010	0.010	0.010
2.000	-	-	100	0.040	0.040	0.040
1.002	-	-	100	0.102	0.102	0.102
1.003	-	-	100	0.039	0.039	0.039
3.000	-	-	100	0.000	0.000	0.000
3.001	-	-	100	0.061	0.061	0.061
3.002	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.049	0.049	0.049
4.000	-	-	100	0.020	0.020	0.020
4.001	-	-	100	0.048	0.048	0.048
1.005	-	-	100	0.029	0.029	0.029
1.006	-	-	100	0.019	0.019	0.019
5.000	-	-	100	0.042	0.042	0.042
5.001	-	-	100	0.032	0.032	0.032
5.002	-	-	100	0.050	0.050	0.050
1.007	-	-	100	0.113	0.113	0.113
1.008	-	-	100	0.000	0.000	0.000
				Total 0.672	Total 0.672	Total 0.672

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.008	S	100.000	96.150	96.150	150	0

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Online Controls for Storm

Complex Manhole: S7.0, DS/PN: S1.002, Volume (m³): 2.7

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0067-2000-0985-2000
Design Head (m)	0.985
Design Flow (l/s)	2.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	67
Invert Level (m)	100.215
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	**Head (m)**	**Flow (l/s)**
Design Point (Calculated)	0.985	2.0
Flush-Flo™	0.295	2.0
Kick-Flo®	0.601	1.6
Mean Flow over Head Range	-	1.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	1.7	1.200	2.2	3.000	3.3	7.000	5.0
0.200	1.9	1.400	2.3	3.500	3.6	7.500	5.1
0.300	2.0	1.600	2.5	4.000	3.8	8.000	5.3
0.400	1.9	1.800	2.6	4.500	4.0	8.500	5.4
0.500	1.8	2.000	2.8	5.000	4.2	9.000	5.6
0.600	1.6	2.200	2.9	5.500	4.4	9.500	5.7
0.800	1.8	2.400	3.0	6.000	4.6		
1.000	2.0	2.600	3.1	6.500	4.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 101.200

Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S3.001, Volume (m³): 2.0

Unit Reference	MD-SCU-0032-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated

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Hydro-Brake® Optimum Manhole: S5.2, DS/PN: S3.001, Volume (m³): 2.0

Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	32
Invert Level (m)	100.000
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.047	0.3
Kick-Flo®	0.047	0.3
Mean Flow over Head Range	-	0.7

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.4	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.5	1.400	1.3	3.500	2.0	7.500	2.8
0.300	0.6	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.7	1.800	1.4	4.500	2.2	8.500	3.0
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.1
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Complex Manhole: S4.0, DS/PN: S1.005, Volume (m³): 2.3

Hydro-Brake® Optimum

Unit Reference	MD-SCU-0100-8000-0600-8000
Design Head (m)	0.600
Design Flow (l/s)	8.0
Flush-Flo™	Calculated
Objective	Linear discharge profile
Application	Surface
Sump Available	Yes
Diameter (mm)	100
Invert Level (m)	99.450
Minimum Outlet Pipe Diameter (mm)	150
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.600	8.0
Flush-Flo™	0.128	4.3

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Hydro-Brake® Optimum

Control Points	Head (m)	Flow (l/s)
Kick-Flo®	0.150	4.2
Mean Flow over Head Range	-	5.3

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	3.6	1.200	11.1	3.000	17.2	7.000	25.8
0.200	4.8	1.400	11.9	3.500	18.5	7.500	26.7
0.300	5.8	1.600	12.7	4.000	19.7	8.000	27.6
0.400	6.6	1.800	13.4	4.500	20.9	8.500	28.4
0.500	7.3	2.000	14.1	5.000	21.9	9.000	29.3
0.600	8.0	2.200	14.8	5.500	23.0	9.500	30.1
0.800	9.2	2.400	15.4	6.000	24.0		
1.000	10.2	2.600	16.0	6.500	24.8		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 100.050

Complex Manhole: S2.1, DS/PN: S5.002, Volume (m³): 1.8

Hydro-Brake® Optimum

Unit Reference	MD-SHE-0049-1000-0800-1000
Design Head (m)	0.800
Design Flow (l/s)	1.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	49
Invert Level (m)	97.785
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	0.800	1.0
Flush-Flo™	0.215	0.9
Kick-Flo®	0.437	0.8
Mean Flow over Head Range	-	0.8

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

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Hydro-Brake® Optimum

Depth (m)	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**	**Depth (m)**	**Flow (l/s)**
0.100	0.8	1.200	1.2	3.000	1.8	7.000	2.7
0.200	0.9	1.400	1.3	3.500	1.9	7.500	2.8
0.300	0.9	1.600	1.4	4.000	2.1	8.000	2.9
0.400	0.8	1.800	1.4	4.500	2.2	8.500	2.9
0.500	0.8	2.000	1.5	5.000	2.3	9.000	3.0
0.600	0.9	2.200	1.6	5.500	2.4	9.500	3.1
0.800	1.0	2.400	1.6	6.000	2.5		
1.000	1.1	2.600	1.7	6.500	2.6		

Weir

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 98.585

Weir Manhole: S1, DS/PN: S1.008, Volume (m^3): 2.0

Discharge Coef 0.544 Width (m) 1.200 Invert Level (m) 97.650

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Storage Structures for Storm

Cellular Storage Manhole: S7.1, DS/PN: S2.000

Invert Level (m) 100.540 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	63.0	63.0	0.900	0.0	88.6
0.800	63.0	88.6			

Porous Car Park Manhole: S7.0, DS/PN: S1.002

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 3.8
Membrane Percolation (mm/hr) 1000 Length (m) 37.7
Max Percolation (l/s) 39.8 Slope (1:X) 50.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 100.215 Cap Volume Depth (m) 0.500

Cellular Storage Manhole: S5.2, DS/PN: S3.001

Invert Level (m) 100.000 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	60.0	60.0	0.900	0.0	87.2
0.800	60.0	87.2			

Porous Car Park Manhole: S4.2, DS/PN: S4.000

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 4.8
Membrane Percolation (mm/hr) 1000 Length (m) 25.5
Max Percolation (l/s) 34.0 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 100.150 Cap Volume Depth (m) 0.500

Porous Car Park Manhole: S4.1, DS/PN: S4.001

Infiltration Coefficient Base (m/hr) 0.00000 Width (m) 2.5
Membrane Percolation (mm/hr) 1000 Length (m) 27.0
Max Percolation (l/s) 18.8 Slope (1:X) 0.0
Safety Factor 2.0 Depression Storage (mm) 5
Porosity 0.30 Evaporation (mm/day) 3
Invert Level (m) 99.960 Cap Volume Depth (m) 0.500

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Porous Car Park Manhole: S4.0, DS/PN: S1.005

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.7
Membrane Percolation (mm/hr)	1000	Length (m)	15.0
Max Percolation (l/s)	23.8	Slope (1:X)	20.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	99.450	Cap Volume Depth (m)	0.500

Cellular Storage Manhole: S2.1, DS/PN: S5.002

Invert Level (m)	97.785	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	52.5	52.5	0.900	0.0	82.1
0.800	52.5	82.1			

Infiltration Basin Manhole: S1, DS/PN: S1.008

Invert Level (m)	96.300	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.01800	Porosity	1.00
Infiltration Coefficient Side (m/hr)	0.01800		

Depth (m)	**Area (m²)**	**Depth (m)**	**Area (m²)**	**Depth (m)**	**Area (m²)**
0.000	373.6	1.050	620.6	1.350	702.6

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 8
Number of Online Controls 5 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 2 year Summer I+0%	102.200	100.830	-0.120	0.000	0.09
S1.001	S8.0	60 minute 2 year Summer I+0%	102.550	100.688	-0.112	0.000	0.14
S2.000	S7.1	120 minute 2 year Winter I+0%	102.200	100.656	0.106	0.000	0.10
S1.002	S7.0	120 minute 2 year Winter I+0%	101.550	100.654	0.214	0.000	0.06
S1.003	S6.0	60 minute 2 year Summer I+0%	101.200	100.120	-0.185	0.000	0.07
S3.000	SDummy	60 minute 2 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	360 minute 2 year Winter I+0%	101.600	100.146	-0.004	0.000	0.04
S3.002	S5.1	120 minute 2 year Winter I+0%	101.600	99.979	-0.101	0.000	0.04
S1.004	S5.0	120 minute 2 year Winter I+0%	100.700	99.976	0.216	0.000	0.17
S4.000	S4.2	120 minute 2 year Winter I+0%	101.350	100.173	-0.127	0.000	0.06
S4.001	S4.1	60 minute 2 year Summer I+0%	101.300	100.002	-0.108	0.000	0.17
S1.005	S4.0	120 minute 2 year Winter I+0%	100.600	99.967	0.292	0.000	0.08
S1.006	S3.0	60 minute 2 year Winter I+0%	99.900	98.481	-0.179	0.000	0.09
S5.000	S2.3	240 minute 2 year Winter I+0%	99.000	98.086	-0.014	0.000	0.10
S5.001	S2.2	240 minute 2 year Winter I+0%	99.400	98.085	0.120	0.000	0.21
S5.002	S2.1	240 minute 2 year Winter I+0%	99.290	98.084	0.149	0.000	0.06
S1.007	S2.0	60 minute 2 year Summer I+0%	98.600	97.456	-0.184	0.000	0.31

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.028		1.2	OK
S1.001	S8.0		0.061		2.0	OK
S2.000	S7.1		7.228	72	1.4	SURCHARGED
S1.002	S7.0		6.993	124	2.0	SURCHARGED
S1.003	S6.0		0.092		5.4	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		8.509	240	0.5	OK
S3.002	S5.1		0.078		0.5	OK
S1.004	S5.0		1.687		5.6	SURCHARGED
S4.000	S4.2		0.868	56	0.8	OK
S4.001	S4.1		0.915	26	3.9	OK
S1.005	S4.0		6.109	44	7.5	SURCHARGED
S1.006	S3.0		0.054		8.2	OK
S5.000	S2.3		0.148		1.4	OK
S5.001	S2.2		0.613		2.3	SURCHARGED
S5.002	S2.1		15.278	220	0.9	SURCHARGED
S1.007	S2.0		0.132		18.3	OK

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2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	960 minute 2 year Winter I+0%	97.650	96.636	0.186	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		138.042	1056	0.0	SURCHARGED

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 8
Number of Online Controls 5 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 10 year Summer I+0%	102.200	100.839	-0.111	0.000	0.15
S1.001	S8.0	120 minute 10 year Winter I+0%	102.550	100.824	0.024	0.000	0.15
S2.000	S7.1	120 minute 10 year Winter I+0%	102.200	100.822	0.272	0.000	0.10
S1.002	S7.0	120 minute 10 year Winter I+0%	101.550	100.821	0.381	0.000	0.06
S1.003	S6.0	60 minute 10 year Summer I+0%	101.200	100.131	-0.174	0.000	0.12
S3.000	SDummy	60 minute 10 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	240 minute 10 year Winter I+0%	101.600	100.241	0.091	0.000	0.04
S3.002	S5.1	60 minute 10 year Winter I+0%	101.600	100.101	0.021	0.000	0.05
S1.004	S5.0	60 minute 10 year Winter I+0%	100.700	100.101	0.341	0.000	0.37
S4.000	S4.2	60 minute 10 year Winter I+0%	101.350	100.186	-0.114	0.000	0.13
S4.001	S4.1	60 minute 10 year Winter I+0%	101.300	100.106	-0.004	0.000	0.25
S1.005	S4.0	60 minute 10 year Winter I+0%	100.600	100.079	0.404	0.000	0.18
S1.006	S3.0	60 minute 10 year Winter I+0%	99.900	98.508	-0.152	0.000	0.23
S5.000	S2.3	240 minute 10 year Winter I+0%	99.000	98.314	0.214	0.000	0.15
S5.001	S2.2	240 minute 10 year Winter I+0%	99.400	98.312	0.347	0.000	0.33
S5.002	S2.1	240 minute 10 year Winter I+0%	99.290	98.311	0.376	0.000	0.06
S1.007	S2.0	60 minute 10 year Winter I+0%	98.600	97.503	-0.137	0.000	0.56

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.039		2.2	OK
S1.001	S8.0		0.407		2.1	SURCHARGED
S2.000	S7.1		17.320	152	1.4	SURCHARGED
S1.002	S7.0		12.026	200	2.0	SURCHARGED
S1.003	S6.0		0.122		8.6	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		14.037	264	0.6	SURCHARGED
S3.002	S5.1		0.307		0.7	SURCHARGED
S1.004	S5.0		2.133		11.9	SURCHARGED
S4.000	S4.2		1.344	28	1.8	OK
S4.001	S4.1		3.282	28	5.8	OK
S1.005	S4.0		8.221	50	17.9	SURCHARGED
S1.006	S3.0		0.088		19.8	OK
S5.000	S2.3		0.406		2.0	SURCHARGED
S5.001	S2.2		0.889		3.5	SURCHARGED
S5.002	S2.1		26.896	304	0.9	SURCHARGED
S1.007	S2.0		0.210		32.4	OK

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10 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	1440 minute 10 year Winter I+0%	97.650	96.794	0.344	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		211.171	1392	0.0	SURCHARGED

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 8
Number of Online Controls 5 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	240 minute 30 year Winter I+0%	102.200	100.968	0.018	0.000	0.09
S1.001	S8.0	240 minute 30 year Winter I+0%	102.550	100.967	0.167	0.000	0.12
S2.000	S7.1	240 minute 30 year Winter I+0%	102.200	100.966	0.416	0.000	0.10
S1.002	S7.0	240 minute 30 year Winter I+0%	101.550	100.964	0.524	0.000	0.06
S1.003	S6.0	60 minute 30 year Summer I+0%	101.200	100.157	-0.148	0.000	0.14
S3.000	SDummy	60 minute 30 year Summer I+0%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	240 minute 30 year Winter I+0%	101.600	100.325	0.175	0.000	0.05
S3.002	S5.1	60 minute 30 year Summer I+0%	101.600	100.136	0.056	0.000	0.06
S1.004	S5.0	60 minute 30 year Summer I+0%	100.700	100.137	0.377	0.000	0.60
S4.000	S4.2	60 minute 30 year Winter I+0%	101.350	100.194	-0.106	0.000	0.19
S4.001	S4.1	60 minute 30 year Winter I+0%	101.300	100.149	0.039	0.000	0.36
S1.005	S4.0	60 minute 30 year Summer I+0%	100.600	100.099	0.424	0.000	0.30
S1.006	S3.0	60 minute 30 year Summer I+0%	99.900	98.532	-0.128	0.000	0.37
S5.000	S2.3	360 minute 30 year Winter I+0%	99.000	98.507	0.407	0.000	0.14
S5.001	S2.2	360 minute 30 year Winter I+0%	99.400	98.505	0.540	0.000	0.32
S5.002	S2.1	360 minute 30 year Winter I+0%	99.290	98.504	0.569	0.000	0.07
S1.007	S2.0	60 minute 30 year Summer I+0%	98.600	97.577	-0.063	0.000	0.93

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.185		1.3	SURCHARGED
S1.001	S8.0		0.705		1.7	SURCHARGED
S2.000	S7.1		26.122	224	1.4	SURCHARGED
S1.002	S7.0		16.276	276	2.0	SURCHARGED
S1.003	S6.0		0.192		10.5	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		18.916	292	0.7	SURCHARGED
S3.002	S5.1		0.377		0.8	SURCHARGED
S1.004	S5.0		2.230		19.4	SURCHARGED
S4.000	S4.2		1.655	28	2.7	OK
S4.001	S4.1		4.299	28	8.3	SURCHARGED
S1.005	S4.0		8.585	54	29.0	SURCHARGED
S1.006	S3.0		0.120		32.3	OK
S5.000	S2.3		0.624		2.0	SURCHARGED
S5.001	S2.2		1.107		3.5	SURCHARGED
S5.002	S2.1		36.714		1.0	SURCHARGED
S1.007	S2.0		0.403		54.1	OK

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30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	1440 minute 30 year Winter I+0%	97.650	96.909	0.459	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		268.466	1776	0.0	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coeffiecient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 8
Number of Online Controls 5 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Cv (Summer)	0.750
Cv (Winter)	0.840

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

Profile(s)	Summer and Winter
Duration(s) (mins)	60, 120, 240, 360, 480, 960, 1440, 2160, 2880, 4320, 5760
Return Period(s) (years)	2, 10, 30, 100
Climate Change (%)	0, 0, 0, 40

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.000	S9.0	60 minute 100 year Winter I+40%	102.200	101.347	0.397	0.000	0.36
S1.001	S8.0	60 minute 100 year Winter I+40%	102.550	101.321	0.521	0.000	0.50
S2.000	S7.1	240 minute 100 year Winter I+40%	102.200	101.244	0.694	0.000	0.25
S1.002	S7.0	120 minute 100 year Winter I+40%	101.550	101.232	0.792	0.000	0.39
S1.003	S6.0	60 minute 100 year Summer I+40%	101.200	100.291	-0.014	0.000	0.24
S3.000	SDummy	60 minute 100 year Summer I+40%	103.000	102.000	-0.150	0.000	0.00
S3.001	S5.2	360 minute 100 year Winter I+40%	101.600	100.642	0.492	0.000	0.07
S3.002	S5.1	60 minute 100 year Summer I+40%	101.600	100.249	0.169	0.000	0.07
S1.004	S5.0	60 minute 100 year Summer I+40%	100.700	100.254	0.494	0.000	1.14
S4.000	S4.2	60 minute 100 year Winter I+40%	101.350	100.283	-0.017	0.000	0.46
S4.001	S4.1	60 minute 100 year Summer I+40%	101.300	100.269	0.159	0.000	0.56
S1.005	S4.0	60 minute 100 year Summer I+40%	100.600	100.136	0.461	0.000	0.61
S1.006	S3.0	60 minute 100 year Summer I+40%	99.900	98.586	-0.074	0.000	0.78
S5.000	S2.3	60 minute 100 year Winter I+40%	99.000	98.769	0.669	0.000	0.83
S5.001	S2.2	60 minute 100 year Winter I+40%	99.400	98.689	0.724	0.000	1.78
S5.002	S2.1	120 minute 100 year Winter I+40%	99.290	98.631	0.696	0.000	1.38
S1.007	S2.0	60 minute 100 year Summer I+40%	98.600	97.800	0.160	0.000	1.94

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S9.0		0.613		5.1	SURCHARGED
S1.001	S8.0		1.106		7.0	SURCHARGED
S2.000	S7.1		43.105	352	3.3	SURCHARGED
S1.002	S7.0		22.240	412	12.7	SURCHARGED
S1.003	S6.0		0.948		17.5	OK
S3.000	SDummy		0.000		0.0	OK
S3.001	S5.2		37.352		0.9	SURCHARGED
S3.002	S5.1		0.505		1.0	SURCHARGED
S1.004	S5.0		2.453		36.8	SURCHARGED
S4.000	S4.2		5.033	16	6.5	OK
S4.001	S4.1		7.044	28	12.9	SURCHARGED
S1.005	S4.0		9.271	62	60.0	SURCHARGED
S1.006	S3.0		0.211		67.3	OK
S5.000	S2.3		0.920		11.3	FLOOD RISK
S5.001	S2.2		1.315		19.3	SURCHARGED
S5.002	S2.1		42.303	472	19.5	SURCHARGED
S1.007	S2.0		1.419		113.0	SURCHARGED

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100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Event	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.
S1.008	S1	2160 minute 100 year Winter I+40%	97.650	97.337	0.887	0.000	0.00

PN	US/MH Name	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.008	S1		509.641	2544	0.0	SURCHARGED

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Summary of Results for 2160 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 300.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	US/CL (m)	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Maximum Vol (m³)	Half Drain Time (mins)	Pipe Flow (l/s)
S1.008	S1	97.650	97.498	1.048	0.000	0.00		613.207	2616	0.0

PN	US/MH Name	Status
S1.008	S1	FLOOD RISK

Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
2160 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
24	0.0	672	0.0	1320	0.0	1968	0.0	2616	0.0	3264	0.0
48	0.0	696	0.0	1344	0.0	1992	0.0	2640	0.0	3288	0.0
72	0.0	720	0.0	1368	0.0	2016	0.0	2664	0.0	3312	0.0
96	0.0	744	0.0	1392	0.0	2040	0.0	2688	0.0	3336	0.0
120	0.0	768	0.0	1416	0.0	2064	0.0	2712	0.0	3360	0.0
144	0.0	792	0.0	1440	0.0	2088	0.0	2736	0.0	3384	0.0
168	0.0	816	0.0	1464	0.0	2112	0.0	2760	0.0	3408	0.0
192	0.0	840	0.0	1488	0.0	2136	0.0	2784	0.0	3432	0.0
216	0.0	864	0.0	1512	0.0	2160	0.0	2808	0.0	3456	0.0
240	0.0	888	0.0	1536	0.0	2184	0.0	2832	0.0	3480	0.0
264	0.0	912	0.0	1560	0.0	2208	0.0	2856	0.0	3504	0.0
288	0.0	936	0.0	1584	0.0	2232	0.0	2880	0.0	3528	0.0
312	0.0	960	0.0	1608	0.0	2256	0.0	2904	0.0	3552	0.0
336	0.0	984	0.0	1632	0.0	2280	0.0	2928	0.0	3576	0.0
360	0.0	1008	0.0	1656	0.0	2304	0.0	2952	0.0	3600	0.0
384	0.0	1032	0.0	1680	0.0	2328	0.0	2976	0.0	3624	0.1
408	0.0	1056	0.0	1704	0.0	2352	0.0	3000	0.0	3648	0.2
432	0.0	1080	0.0	1728	0.0	2376	0.0	3024	0.0	3672	0.4
456	0.0	1104	0.0	1752	0.0	2400	0.0	3048	0.0	3696	0.5
480	0.0	1128	0.0	1776	0.0	2424	0.0	3072	0.0	3720	0.8
504	0.0	1152	0.0	1800	0.0	2448	0.0	3096	0.0	3744	1.2
528	0.0	1176	0.0	1824	0.0	2472	0.0	3120	0.0	3768	1.3
552	0.0	1200	0.0	1848	0.0	2496	0.0	3144	0.0	3792	1.4
576	0.0	1224	0.0	1872	0.0	2520	0.0	3168	0.0	3816	1.4
600	0.0	1248	0.0	1896	0.0	2544	0.0	3192	0.0	3840	1.5
624	0.0	1272	0.0	1920	0.0	2568	0.0	3216	0.0	3864	1.5
648	0.0	1296	0.0	1944	0.0	2592	0.0	3240	0.0	3888	1.5

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Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)
2160 minute 100 year Winter
Input Hydrograph Type: User Defined

Time (mins)	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**	**Time (mins)**	**Flow (l/s)**
3912	1.6	5064	1.1	6216	0.0	7368	0.0	8520	0.0	9672	0.0
3936	1.7	5088	0.8	6240	0.0	7392	0.0	8544	0.0	9696	0.0
3960	1.9	5112	0.6	6264	0.0	7416	0.0	8568	0.0	9720	0.0
3984	2.1	5136	0.4	6288	0.0	7440	0.0	8592	0.0	9744	0.0
4008	2.3	5160	0.3	6312	0.0	7464	0.0	8616	0.0	9768	0.0
4032	2.6	5184	0.3	6336	0.0	7488	0.0	8640	0.0	9792	0.0
4056	2.9	5208	0.2	6360	0.0	7512	0.0	8664	0.0	9816	0.0
4080	3.3	5232	0.2	6384	0.0	7536	0.0	8688	0.0	9840	0.0
4104	3.7	5256	0.1	6408	0.0	7560	0.0	8712	0.0	9864	0.0
4128	4.2	5280	0.1	6432	0.0	7584	0.0	8736	0.0	9888	0.0
4152	4.9	5304	0.1	6456	0.0	7608	0.0	8760	0.0	9912	0.0
4176	5.4	5328	0.1	6480	0.0	7632	0.0	8784	0.0	9936	0.0
4200	5.9	5352	0.1	6504	0.0	7656	0.0	8808	0.0	9960	0.0
4224	6.3	5376	0.1	6528	0.0	7680	0.0	8832	0.0	9984	0.0
4248	6.6	5400	0.0	6552	0.0	7704	0.0	8856	0.0	10008	0.0
4272	6.7	5424	0.0	6576	0.0	7728	0.0	8880	0.0	10032	0.0
4296	7.0	5448	0.0	6600	0.0	7752	0.0	8904	0.0	10056	0.0
4320	7.3	5472	0.0	6624	0.0	7776	0.0	8928	0.0	10080	0.0
4344	7.4	5496	0.0	6648	0.0	7800	0.0	8952	0.0	10104	0.0
4368	7.4	5520	0.0	6672	0.0	7824	0.0	8976	0.0	10128	0.0
4392	7.4	5544	0.0	6696	0.0	7848	0.0	9000	0.0	10152	0.0
4416	7.2	5568	0.0	6720	0.0	7872	0.0	9024	0.0	10176	0.0
4440	7.0	5592	0.0	6744	0.0	7896	0.0	9048	0.0	10200	0.0
4464	6.8	5616	0.0	6768	0.0	7920	0.0	9072	0.0	10224	0.0
4488	6.5	5640	0.0	6792	0.0	7944	0.0	9096	0.0	10248	0.0
4512	6.3	5664	0.0	6816	0.0	7968	0.0	9120	0.0	10272	0.0
4536	6.1	5688	0.0	6840	0.0	7992	0.0	9144	0.0	10296	0.0
4560	5.5	5712	0.0	6864	0.0	8016	0.0	9168	0.0	10320	0.0
4584	4.9	5736	0.0	6888	0.0	8040	0.0	9192	0.0	10344	0.0
4608	4.1	5760	0.0	6912	0.0	8064	0.0	9216	0.0	10368	0.0
4632	3.8	5784	0.0	6936	0.0	8088	0.0	9240	0.0	10392	0.0
4656	3.5	5808	0.0	6960	0.0	8112	0.0	9264	0.0	10416	0.0
4680	3.2	5832	0.0	6984	0.0	8136	0.0	9288	0.0	10440	0.0
4704	3.0	5856	0.0	7008	0.0	8160	0.0	9312	0.0	10464	0.0
4728	2.8	5880	0.0	7032	0.0	8184	0.0	9336	0.0	10488	0.0
4752	2.7	5904	0.0	7056	0.0	8208	0.0	9360	0.0	10512	0.0
4776	2.5	5928	0.0	7080	0.0	8232	0.0	9384	0.0	10536	0.0
4800	2.5	5952	0.0	7104	0.0	8256	0.0	9408	0.0	10560	0.0
4824	2.4	5976	0.0	7128	0.0	8280	0.0	9432	0.0	10584	0.0
4848	2.4	6000	0.0	7152	0.0	8304	0.0	9456	0.0	10608	0.0
4872	2.4	6024	0.0	7176	0.0	8328	0.0	9480	0.0	10632	0.0
4896	2.3	6048	0.0	7200	0.0	8352	0.0	9504	0.0	10656	0.0
4920	2.3	6072	0.0	7224	0.0	8376	0.0	9528	0.0	10680	0.0
4944	2.2	6096	0.0	7248	0.0	8400	0.0	9552	0.0	10704	0.0
4968	2.2	6120	0.0	7272	0.0	8424	0.0	9576	0.0	10728	0.0
4992	2.1	6144	0.0	7296	0.0	8448	0.0	9600	0.0	10752	0.0
5016	1.8	6168	0.0	7320	0.0	8472	0.0	9624	0.0	10776	0.0
5040	1.5	6192	0.0	7344	0.0	8496	0.0	9648	0.0	10800	0.0

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Input Hydrograph Manhole S1, DS/PN S1.008 (Storm)

2160 minute 100 year Winter

Input Hydrograph Type: User Defined

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
10824	0.0	11304	0.0	11784	0.0	12264	0.0	12744	0.0	13224	0.0
10848	0.0	11328	0.0	11808	0.0	12288	0.0	12768	0.0	13248	0.0
10872	0.0	11352	0.0	11832	0.0	12312	0.0	12792	0.0	13272	0.0
10896	0.0	11376	0.0	11856	0.0	12336	0.0	12816	0.0	13296	0.0
10920	0.0	11400	0.0	11880	0.0	12360	0.0	12840	0.0	13320	0.0
10944	0.0	11424	0.0	11904	0.0	12384	0.0	12864	0.0	13344	0.0
10968	0.0	11448	0.0	11928	0.0	12408	0.0	12888	0.0	13368	0.0
10992	0.0	11472	0.0	11952	0.0	12432	0.0	12912	0.0	13392	0.0
11016	0.0	11496	0.0	11976	0.0	12456	0.0	12936	0.0	13416	0.0
11040	0.0	11520	0.0	12000	0.0	12480	0.0	12960	0.0	13440	0.0
11064	0.0	11544	0.0	12024	0.0	12504	0.0	12984	0.0	13464	0.0
11088	0.0	11568	0.0	12048	0.0	12528	0.0	13008	0.0	13488	0.0
11112	0.0	11592	0.0	12072	0.0	12552	0.0	13032	0.0	13512	0.0
11136	0.0	11616	0.0	12096	0.0	12576	0.0	13056	0.0	13536	0.0
11160	0.0	11640	0.0	12120	0.0	12600	0.0	13080	0.0	13560	0.0
11184	0.0	11664	0.0	12144	0.0	12624	0.0	13104	0.0	13584	0.0
11208	0.0	11688	0.0	12168	0.0	12648	0.0	13128	0.0	13608	0.0
11232	0.0	11712	0.0	12192	0.0	12672	0.0	13152	0.0	13632	0.0
11256	0.0	11736	0.0	12216	0.0	12696	0.0	13176	0.0	13656	0.0
11280	0.0	11760	0.0	12240	0.0	12720	0.0	13200	0.0	13680	0.0

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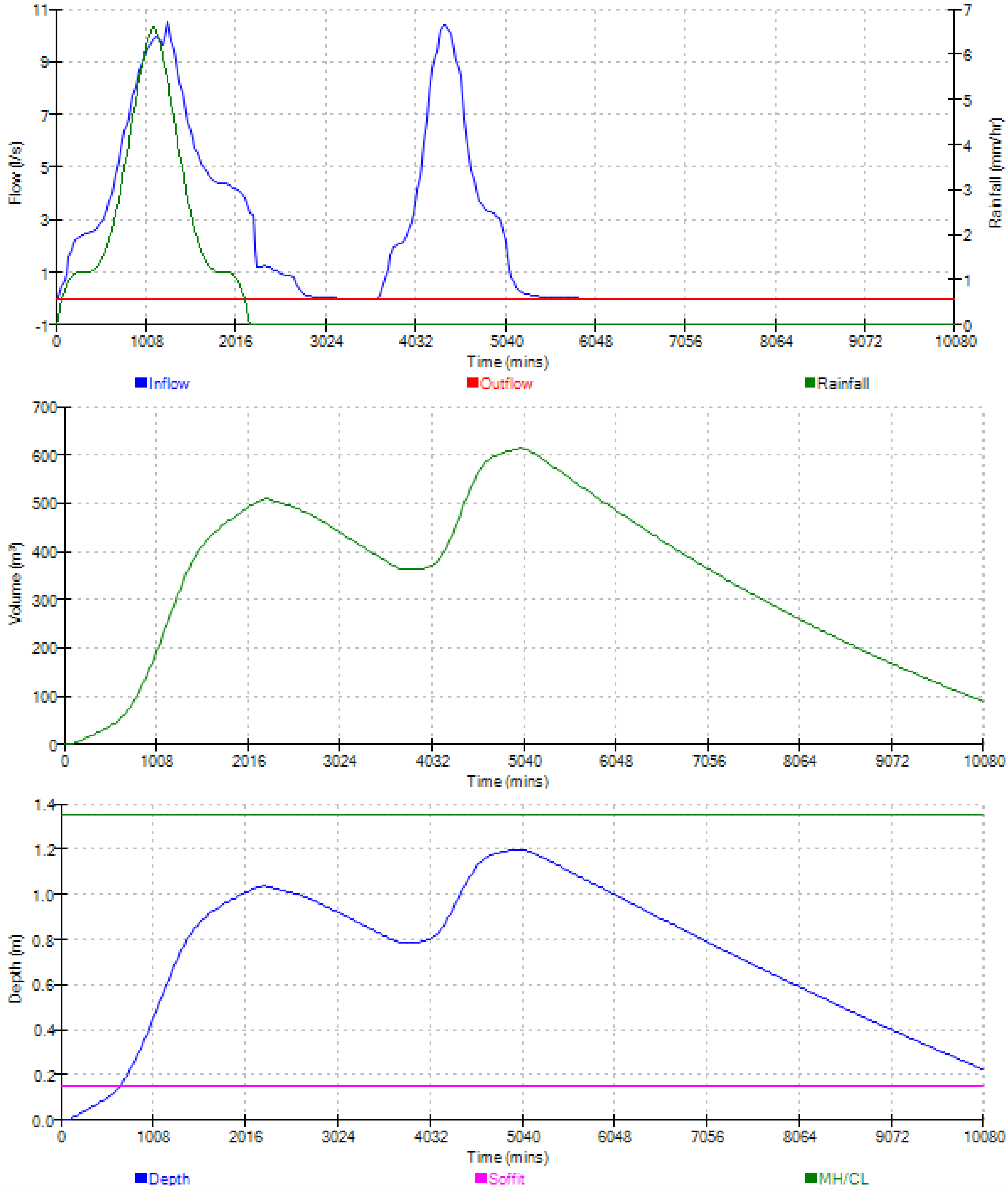
Graphs for Pipe S1.008 US/MH S1 (Storm)
2160 minute 100 year Winter
Status: FLOOD RISK



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Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1893 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.807	0.407	0.2	29.0	O K
120 min Summer	97.884	0.484	0.2	34.5	O K
180 min Summer	97.933	0.533	0.2	38.0	O K
240 min Summer	97.968	0.568	0.2	40.5	O K
360 min Summer	98.012	0.612	0.2	43.6	O K
480 min Summer	98.036	0.636	0.2	45.3	O K
600 min Summer	98.049	0.649	0.2	46.3	O K
720 min Summer	98.055	0.655	0.2	46.7	O K
960 min Summer	98.055	0.655	0.2	46.6	O K
1440 min Summer	98.028	0.628	0.2	44.7	O K
2160 min Summer	97.985	0.585	0.2	41.7	O K
2880 min Summer	97.950	0.550	0.2	39.2	O K
4320 min Summer	97.894	0.494	0.2	35.2	O K
5760 min Summer	97.851	0.451	0.2	32.2	O K
60 min Winter	97.857	0.457	0.2	32.5	O K
120 min Winter	97.944	0.544	0.2	38.8	O K
180 min Winter	98.001	0.601	0.2	42.8	O K
240 min Winter	98.041	0.641	0.2	45.7	O K
360 min Winter	98.092	0.692	0.2	49.3	O K
480 min Winter	98.122	0.722	0.3	51.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	72
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	250
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	606
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	962
1440 min Summer	5.190	0.0	1396
2160 min Summer	3.663	0.0	1712
2880 min Summer	2.865	0.0	2080
4320 min Summer	2.038	0.0	2896
5760 min Summer	1.612	0.0	3696
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	246
360 min Winter	16.102	0.0	362
480 min Winter	12.880	0.0	478

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	98.139	0.739	0.3	52.6	O K
720 min Winter	98.148	0.748	0.3	53.3	O K
960 min Winter	98.152	0.752	0.3	53.6	O K
1440 min Winter	98.131	0.731	0.3	52.1	O K
2160 min Winter	98.079	0.679	0.2	48.4	O K
2880 min Winter	98.037	0.637	0.2	45.4	O K
4320 min Winter	97.963	0.563	0.2	40.1	O K
5760 min Winter	97.900	0.500	0.2	35.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	596
720 min Winter	9.303	0.0	710
960 min Winter	7.328	0.0	940
1440 min Winter	5.191	0.0	1384
2160 min Winter	3.663	0.0	1964
2880 min Winter	2.865	0.0	2224
4320 min Winter	2.038	0.0	3124
5760 min Winter	1.612	0.0	4032

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.066

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

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Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

Summary of Results for 30 year Return Period

Half Drain Time : 1062 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.618	0.218	0.2	15.5	O K
120 min Summer	97.661	0.261	0.2	18.6	O K
180 min Summer	97.685	0.285	0.2	20.3	O K
240 min Summer	97.702	0.302	0.2	21.5	O K
360 min Summer	97.720	0.320	0.2	22.8	O K
480 min Summer	97.728	0.328	0.2	23.4	O K
600 min Summer	97.730	0.330	0.2	23.5	O K
720 min Summer	97.729	0.329	0.2	23.4	O K
960 min Summer	97.721	0.321	0.2	22.9	O K
1440 min Summer	97.703	0.303	0.2	21.6	O K
2160 min Summer	97.678	0.278	0.2	19.8	O K
2880 min Summer	97.656	0.256	0.2	18.3	O K
4320 min Summer	97.620	0.220	0.2	15.7	O K
5760 min Summer	97.591	0.191	0.2	13.6	O K
60 min Winter	97.645	0.245	0.2	17.5	O K
120 min Winter	97.694	0.294	0.2	20.9	O K
180 min Winter	97.722	0.322	0.2	23.0	O K
240 min Winter	97.741	0.341	0.2	24.3	O K
360 min Winter	97.764	0.364	0.2	25.9	O K
480 min Winter	97.775	0.375	0.2	26.7	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	130
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	248
360 min Summer	8.898	0.0	366
480 min Summer	7.129	0.0	484
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	720
960 min Summer	4.089	0.0	844
1440 min Summer	2.917	0.0	1084
2160 min Summer	2.081	0.0	1476
2880 min Summer	1.643	0.0	1880
4320 min Summer	1.188	0.0	2688
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	128
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	474

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.779	0.379	0.2	27.0	O K
720 min Winter	97.780	0.380	0.2	27.0	O K
960 min Winter	97.773	0.373	0.2	26.6	O K
1440 min Winter	97.749	0.349	0.2	24.9	O K
2160 min Winter	97.717	0.317	0.2	22.6	O K
2880 min Winter	97.686	0.286	0.2	20.4	O K
4320 min Winter	97.632	0.232	0.2	16.5	O K
5760 min Winter	97.587	0.187	0.2	13.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	588
720 min Winter	5.169	0.0	700
960 min Winter	4.089	0.0	916
1440 min Winter	2.917	0.0	1154
2160 min Winter	2.081	0.0	1604
2880 min Winter	1.643	0.0	2052
4320 min Winter	1.188	0.0	2904
5760 min Winter	0.953	0.0	3704

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.066

Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)	Time From:	(mins) To:	Area (ha)
0	4	0.022	4	8	0.022	8	12	0.022

Model Details

Storage is Online Cover Level (m) 98.800

Cellular Storage Structure

Invert Level (m) 97.400 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	75.0	75.0	0.900	0.0	103.0
0.800	75.0	103.0			

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Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 1554 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.631	0.431	0.1	9.2	O K
120 min Summer	97.711	0.511	0.1	10.9	O K
180 min Summer	97.762	0.562	0.1	12.0	O K
240 min Summer	97.798	0.598	0.1	12.8	O K
360 min Summer	97.841	0.641	0.1	13.7	O K
480 min Summer	97.864	0.664	0.1	14.2	O K
600 min Summer	97.875	0.675	0.1	14.4	O K
720 min Summer	97.879	0.679	0.1	14.5	O K
960 min Summer	97.872	0.672	0.1	14.4	O K
1440 min Summer	97.841	0.641	0.1	13.7	O K
2160 min Summer	97.798	0.598	0.1	12.8	O K
2880 min Summer	97.761	0.561	0.1	12.0	O K
4320 min Summer	97.703	0.503	0.1	10.7	O K
5760 min Summer	97.657	0.457	0.1	9.8	O K
60 min Winter	97.683	0.483	0.1	10.3	O K
120 min Winter	97.775	0.575	0.1	12.3	O K
180 min Winter	97.833	0.633	0.1	13.5	O K
240 min Winter	97.874	0.674	0.1	14.4	O K
360 min Winter	97.925	0.725	0.1	15.5	O K
480 min Winter	97.953	0.753	0.1	16.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	60.004	0.0	70
120 min Summer	36.232	0.0	130
180 min Summer	26.997	0.0	190
240 min Summer	21.858	0.0	248
360 min Summer	16.102	0.0	368
480 min Summer	12.880	0.0	486
600 min Summer	10.784	0.0	604
720 min Summer	9.303	0.0	724
960 min Summer	7.328	0.0	960
1440 min Summer	5.190	0.0	1222
2160 min Summer	3.663	0.0	1584
2880 min Summer	2.865	0.0	1992
4320 min Summer	2.038	0.0	2812
5760 min Summer	1.612	0.0	3632
60 min Winter	60.004	0.0	70
120 min Winter	36.232	0.0	128
180 min Winter	26.997	0.0	186
240 min Winter	21.858	0.0	244
360 min Winter	16.102	0.0	360
480 min Winter	12.880	0.0	476

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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.968	0.768	0.1	16.4	O K
720 min Winter	97.975	0.775	0.1	16.6	O K
960 min Winter	97.973	0.773	0.1	16.5	O K
1440 min Winter	97.942	0.742	0.1	15.9	O K
2160 min Winter	97.889	0.689	0.1	14.7	O K
2880 min Winter	97.843	0.643	0.1	13.7	O K
4320 min Winter	97.763	0.563	0.1	12.0	O K
5760 min Winter	97.696	0.496	0.1	10.6	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	10.784	0.0	592
720 min Winter	9.303	0.0	706
960 min Winter	7.328	0.0	932
1440 min Winter	5.191	0.0	1356
2160 min Winter	3.663	0.0	1684
2880 min Winter	2.865	0.0	2140
4320 min Winter	2.038	0.0	3036
5760 min Winter	1.612	0.0	3920

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.021

Time From:	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**
0	4	0.007	4	8	0.007	8	12	0.007

Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	Area (m^2)	Inf. Area (m^2)	Depth (m)	Area (m^2)	Inf. Area (m^2)
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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Summary of Results for 30 year Return Period

Half Drain Time : 969 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
60 min Summer	97.431	0.231	0.1	4.9	O K
120 min Summer	97.476	0.276	0.1	5.9	O K
180 min Summer	97.501	0.301	0.1	6.4	O K
240 min Summer	97.518	0.318	0.1	6.8	O K
360 min Summer	97.536	0.336	0.1	7.2	O K
480 min Summer	97.544	0.344	0.1	7.3	O K
600 min Summer	97.545	0.345	0.1	7.4	O K
720 min Summer	97.542	0.342	0.1	7.3	O K
960 min Summer	97.534	0.334	0.1	7.1	O K
1440 min Summer	97.515	0.315	0.1	6.7	O K
2160 min Summer	97.489	0.289	0.1	6.2	O K
2880 min Summer	97.467	0.267	0.1	5.7	O K
4320 min Summer	97.429	0.229	0.1	4.9	O K
5760 min Summer	97.399	0.199	0.1	4.3	O K
60 min Winter	97.459	0.259	0.1	5.5	O K
120 min Winter	97.511	0.311	0.1	6.6	O K
180 min Winter	97.540	0.340	0.1	7.3	O K
240 min Winter	97.560	0.360	0.1	7.7	O K
360 min Winter	97.582	0.382	0.1	8.2	O K
480 min Winter	97.593	0.393	0.1	8.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
60 min Summer	32.620	0.0	70
120 min Summer	19.975	0.0	128
180 min Summer	14.907	0.0	188
240 min Summer	12.068	0.0	246
360 min Summer	8.898	0.0	364
480 min Summer	7.129	0.0	482
600 min Summer	5.980	0.0	602
720 min Summer	5.169	0.0	704
960 min Summer	4.089	0.0	806
1440 min Summer	2.917	0.0	1048
2160 min Summer	2.081	0.0	1456
2880 min Summer	1.643	0.0	1856
4320 min Summer	1.188	0.0	2680
5760 min Summer	0.953	0.0	3464
60 min Winter	32.620	0.0	70
120 min Winter	19.975	0.0	126
180 min Winter	14.907	0.0	184
240 min Winter	12.068	0.0	242
360 min Winter	8.898	0.0	358
480 min Winter	7.129	0.0	472

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Summary of Results for 30 year Return Period

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
600 min Winter	97.596	0.396	0.1	8.5	O K
720 min Winter	97.595	0.395	0.1	8.4	O K
960 min Winter	97.586	0.386	0.1	8.3	O K
1440 min Winter	97.562	0.362	0.1	7.7	O K
2160 min Winter	97.527	0.327	0.1	7.0	O K
2880 min Winter	97.495	0.295	0.1	6.3	O K
4320 min Winter	97.440	0.240	0.1	5.1	O K
5760 min Winter	97.395	0.195	0.1	4.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
600 min Winter	5.980	0.0	584
720 min Winter	5.169	0.0	694
960 min Winter	4.089	0.0	904
1440 min Winter	2.917	0.0	1120
2160 min Winter	2.081	0.0	1580
2880 min Winter	1.643	0.0	2024
4320 min Winter	1.188	0.0	2864
5760 min Winter	0.953	0.0	3688

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	30
FEH Rainfall Version	2013
Site Location	GB 430500 218950 SP 30500 18950
Data Type	Catchment
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	60
Longest Storm (mins)	5760
Climate Change %	+0

Time Area Diagram

Total Area (ha) 0.021

Time From:	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**	**Time From:**	**(mins) To:**	**Area (ha)**
0	4	0.007	4	8	0.007	8	12	0.007

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Model Details

Storage is Online Cover Level (m) 98.400

Cellular Storage Structure

Invert Level (m) 97.200 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.01800 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.01800

Depth (m)	**Area (m²)**	**Inf. Area (m²)**	**Depth (m)**	**Area (m²)**	**Inf. Area (m²)**
0.000	22.5	22.5	0.900	0.0	40.9
0.800	22.5	40.9			

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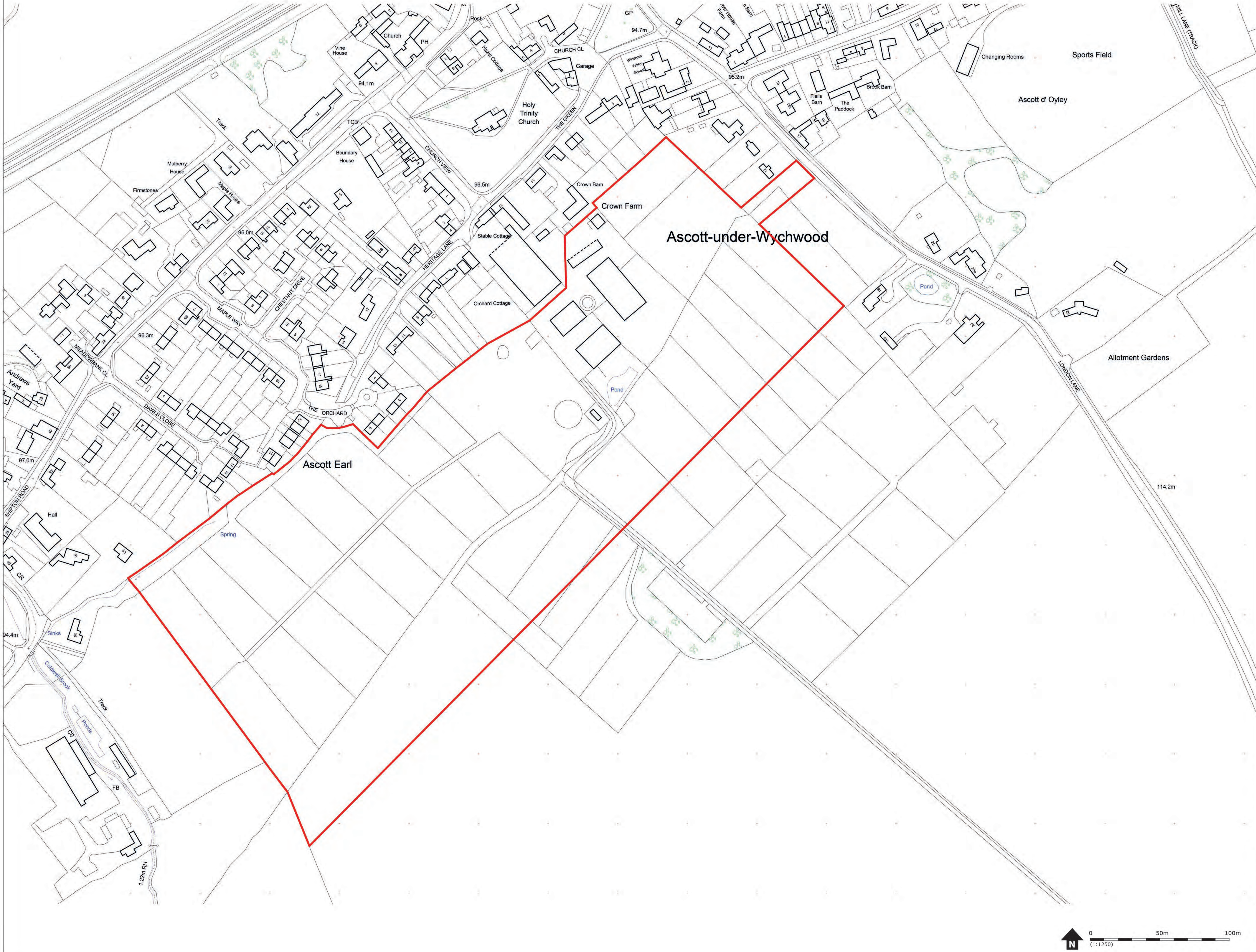
Appendix N

Land Controlled by Appellant

A1



NOTES

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Contractors, Sub-contractors and suppliers are to check all relevant dimensions and levels of the site and building before commencing any shop drawings or building work. Any discrepancies should be recorded to the Architect.
Where applicable this drawing is to be read in conjunction with the Consultants' drawings.

REV	DESCRIPTION	DATE	AUTHOR	CHK'D
P1	Preliminary Issue	30/07/19	GR/SWD	GR

KEY

Site Boundary

thrive. architects

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PROJECT
Ascott Under Wychwood

For: Obsidian Strategic AA Limited

DRAWING
Red Line Plan - 01

SCALE	DATE	AUTHOR	CHK'D
1:1250 @ A1	30/07/19	GR/SWD	GR

JOB NO.	DRAWING NO.	REV
OBSI180824	RLP-01	P1